

|                                                                                   |                              |
|-----------------------------------------------------------------------------------|------------------------------|
|  | <b>SFERA PROPERTIES CORP</b> |
| <b>PROYECTO CAVAROSA</b>                                                          |                              |
| <b>INVESTIGACIÓN GEOTÉCNICA</b>                                                   |                              |
| <b>TRABAJO No.: 2-1259</b>                                                        |                              |

| Rev. | Fecha de Inscripción | Descripción   | Compilado por | Revisado por | Presentado por |
|------|----------------------|---------------|---------------|--------------|----------------|
| A    | -                    | Informe Final |               |              |                |
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|      |                      |               | Fecha         | Fecha        | Fecha          |
|      |                      |               |               |              |                |
|      |                      |               |               |              |                |
|      |                      |               |               |              |                |
|      |                      |               |               |              |                |

27 de marzo de 2024

Señores  
**SFERA PROPERTIES CORP**  
Ciudad.

Asunto: **Investigación Geotécnica, Proyecto  
"Cavarosa"**

Estimados Señores:

Con la presente tenemos el agrado de adjuntarles el informe de la investigación geotécnica realizada con el fin de obtener información para el diseño de los cimientos del proyecto "Cavarosa", ubicado en la Calzada de Amador, Ciudad de Panamá, Provincia de Panamá, República de Panamá.

Adjunto también le estamos incluyendo la cuenta por nuestros servicios profesionales, la cual agradeceríamos nos sea cancelada al recibo de este informe.

Indicándoles que estamos a su disposición para cualquier aclaración sobre la información adjunta, nos es grato suscribirnos.

Atentamente,

**TECNILAB, S.A.**

Ing. Bruno R. Barranco J.  
Gerente General

BRBJ/ah. 24.03-153  
Adj.: Informe y Cuenta  
c.c.: Archivo 2-1259

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## INFORME SOBRE INVESTIGACIÓN GEOTÉCNICA

Trabajo No.: 2-1259

Fecha: marzo 2024

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP

**1.- OBJETIVO:** El propósito de esta investigación fue el determinar las condiciones generales del subsuelo existente en el área, con el fin de obtener información para el diseño de los cimientos del proyecto “Cavarosa”, el cual consta de un (1) edificio planta baja más quince (15) altos.

**2.- LOCALIZACIÓN:** La investigación fue realizada en Calzada de Amador, Ciudad de Panamá. En el Apéndice “G”, “**Detalle de Localización**”, se muestra la ubicación general del sitio y la posición de cada perforación. En el Apéndice “O”, “**Fotografías**”, se muestra la condición actual del sitio donde se realizaron las perforaciones además de los materiales que conforman la estratigrafía del sitio.

**3.- TRABAJO REALIZADO:** La investigación consistió en cinco (5) perforaciones, las cuales fueron realizadas con equipo mecánico rotativo, de las cuales cuatro (4) se llevaron hasta cortar 5.00m en roca sana, y una (1) hasta 30.00m para ensayo Downhole. Además, se realizó la descripción visual de los suelos encontrados, por estrato; se efectuaron pruebas de penetración estándar (ASTM D 1586) a cada 1.50 metros, para obtener la capacidad de soporte de los suelos; a las muestras recuperadas se les determinó la humedad natural (ASTM D 2216); a los testigos de roca recuperados se les realizó su descripción geológica se les determinó su RQD, densidad y se realizaron ensayos de compresión simple (ASTM D 7012).

Además, se hicieron mediciones a las 24 horas de terminadas las perforaciones para determinar la ubicación del nivel freático, este fue observado como se muestra en el **Cuadro No.1**.

Indicamos que la condición encontrada en el nivel freático puede variar dependiendo del estado del tiempo y la época del año, si se requiere determinar con certeza esta condición es necesario instalar un sistema de monitoreo. Por lo tanto, la información aquí presentada es meramente informativa y no apta para diseño.

Las perforaciones realizadas con el equipo mecánico rotativo alcanzaron profundidades entre 23.50m (Hoyo No.2) y 30.00m (Hoyo No.5).

Adicionalmente, en el Hoyo No.5 se realizó un ensayo Downhole, basado en el ASTM D 7400. El método consiste en utilizar un geófono diseñado para ensayos de este tipo, el cual está conectado a un sismógrafo, por medio del cual se obtiene los registros de la velocidad de ondas “P” y “S”.

Las ondas “S” o cortantes, se generan golpeando un tablón de madera lateralmente y las ondas “P” o de compresión, se generan por medio de una placa de metal, la cual se golpea verticalmente. El geófono, es colocado a intervalos de 1.00 m, a partir de los 1.00 metros de profundidad, hasta llegar a los 30.00m de profundidad, según lo exige la norma.

Para optimizar los resultados de velocidad de onda y simular la condición natural del sitio, al instalar la camisa de PVC se rellena con una mezcla de bentonita y cemento el espacio anular que se encuentra entre esta y las paredes del sondeo. El procesamiento de data será realizado utilizando el programa Pick Win, fabricado por Geometrics.

Con los resultados obtenidos, se procedió a confeccionar el perfil sísmico del sitio, para el mismo se analizaron las velocidades obtenidas por medición directa, comparándola con el tipo de material y las velocidades que estos normalmente tienen.

En cada intervalo se tomaron tres (3) lecturas, en cada lado del tablón, formando dos (2) archivos para ondas cortantes y un (1) archivo con tres (3) lecturas de ondas “P”.

El realizar los ensayos a ambos lados del tablón, permite invertir la polaridad de la onda con esto se logra determinar la velocidad de la onda cortante y la onda “P”, se toma como referencia, para revisar si la velocidad de las ondas “S” es correcta.

En el Apéndice “H”, “**Ensayo Downhole**”, se muestran las velocidades para cada intervalo además de los cálculos para la obtención de la velocidad de onda cortante para el cual se utilizaron los treinta (30) intervalos analizados.

En el Apéndice “I”, **“Perfil de Perforación”**, se presenta en detalle la información obtenida en la investigación, en cada una de las perforaciones realizadas; también se muestra gráficamente los **Resultados de las Pruebas de Penetración (S.P.T.)**, y el **Contenido Natural de Humedad (%)**, en donde se indica la humedad de los suelos existentes en el sitio, a las distintas profundidades de las pruebas de penetración, el Apéndice “J”, **“Estratigrafía”**, muestra gráficamente la estratificación encontrada en el área investigada, el Apéndice “K”, **“Datos sobre Testigos de Roca”**, muestra la información concerniente a las muestras de rocas obtenidas, incluyendo la densidad, la compresión axial y los resultados del índice de calidad de la roca (RQD).

La profundidad de las perforaciones y las longitudes de perforación en suelo y roca fueron como se indica en el siguiente cuadro:

**CUADRO No.1: RESUMEN DE LAS PERFORACIONES**

| <b>HOYO<br/>No.</b> | <b>TOTAL<br/>PERFORADO<br/>(m.)</b> | <b>PERFORACIÓN<br/>EN SUELO<br/>(m.)</b> | <b>PERFORACIÓN<br/>EN ROCA<br/>(m)</b> | <b>PRUEBAS<br/>SPT<br/>(c.u.)</b> | <b>NIVEL<br/>FREÁTICO<br/>(m)</b> |
|---------------------|-------------------------------------|------------------------------------------|----------------------------------------|-----------------------------------|-----------------------------------|
| 1                   | 26.00                               | 19.50                                    | 6.50                                   | 8                                 | 12.40                             |
| 2                   | 23.50                               | 17.50                                    | 6.00                                   | 12                                | -                                 |
| 3                   | 28.50                               | 22.50                                    | 6.00                                   | 14                                | -                                 |
| 4                   | 29.10                               | 24.00                                    | 5.10                                   | 17                                | -                                 |
| 5                   | 30.00                               | 23.74                                    | 6.26                                   | 15                                | -                                 |
| <b>TOTAL</b>        | <b>137.10</b>                       | <b>107.24</b>                            | <b>29.86</b>                           | <b>66</b>                         | <b>-</b>                          |

Se realizaron tres (3) pruebas de placa (ASMT D 1196), con el objetivo de obtener la capacidad de soporte y el coeficiente de balastro del suelo, las cuales consistieron en aplicar una carga a la superficie del terreno y determinar la deformación vertical. La carga es transmitida al suelo a través de un juego de placas metálicas circulares de 18, 24, 30 pulgadas de diámetro y de una (1) pulgada de espesor, para lo cual se utiliza un gato hidráulico para aplicar la carga determinada, y mediante un punto de referencia fijo se determina el desplazamiento vertical de la placa.

Los resultados de las pruebas de placa se muestran en el Apéndice “N”, **“Pruebas de Placa”**.

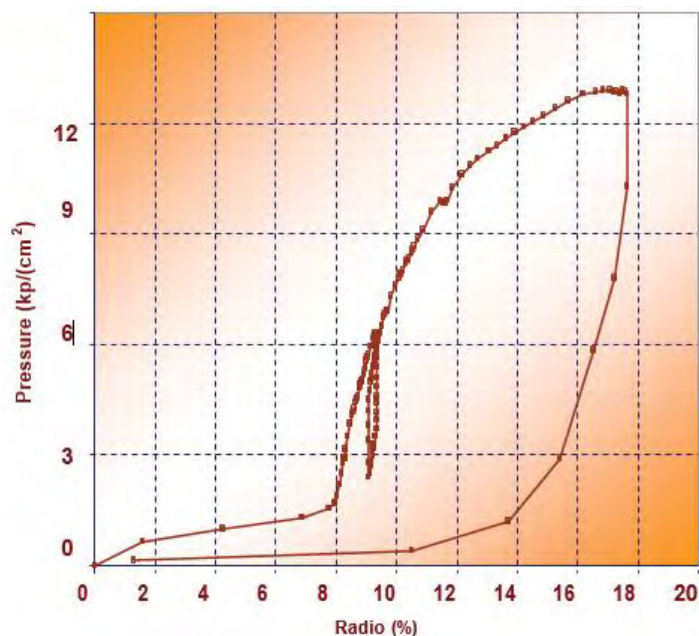
El alcance de los trabajos incluyo la realización de cuatro (4) ensayo de presiómetro en los Hoyos No.2 y No.3, a distintas profundidades (un presiómetro por estrato). De los ensayos presiométricos se obtiene una respuesta esfuerzo-deformación del terreno "in situ", de manera que se pueda calcular el módulo de deformación presiométrico y otros parámetros necesarios para una buena caracterización del terreno.

En el caso de los ensayos realizados en rocas, el ensayo presiométrico permite disminuir notablemente el efecto escala que se produce, respecto a los ensayos de laboratorio convencionales, en función principalmente, del grado de fracturación del terreno, homogeneidades, otros.

En determinadas condiciones, en las que no se requiera sobrepasar una determinada presión, ni una deformación límite para la camisa elástica del presiómetro, se puede alcanzar la presión de fluencia y un tramo de la curva carga-deformación, correspondiente al comportamiento plástico del terreno se pueden estimar las siguientes características geotécnicas del terreno: cohesión, ángulo de rozamiento interno, y  $K_0$ ; en función de los datos disponibles.

Como resultado de un ensayo presiométrico, se puede obtener, en el caso más favorable, una gráfica como la que se muestra en la **Figura No.1** En ella se pueden distinguir las etapas siguientes de deformación:

- Adaptación de la camisa al sondeo.
- Deformación elástica.
- Deformación plástica.
- Rotura del terreno.



**FIGURA No.1: CURVA TÍPICA DE FALLA DE UN ENSAYO PRESIOMÉTRICO**

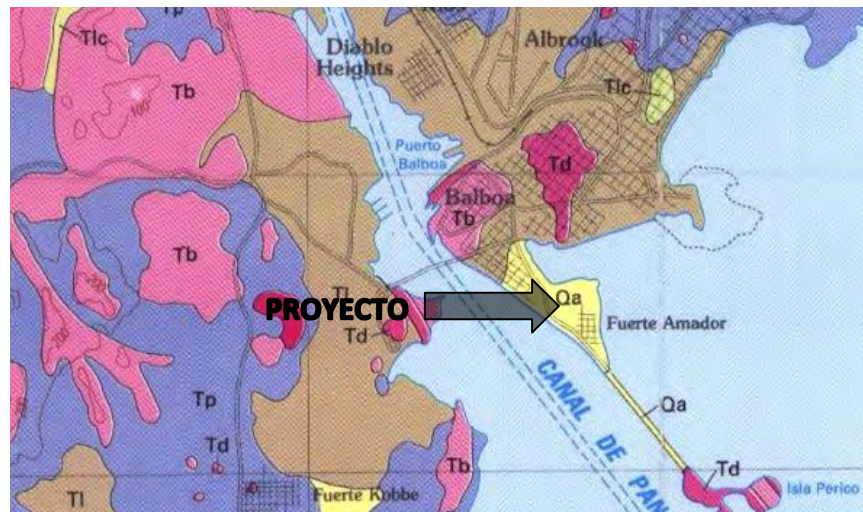
Los resultados de los ensayos presiométricos se muestran en el Apéndice “L”, **“Ensayo Presiométrico”**.

Las pruebas de laboratorio realizadas a las muestras obtenidas en las perforaciones y los resultados de las mismas se muestran en el Apéndice “M”, **“Pruebas de Laboratorio”**.

**CUADRO No.2: RESUMEN DE LAS PRUEBAS DE LABORATORIO**

| No. | ENSAYO/NORMA                                                             | TIPO DE MUESTRA | CANTIDAD |
|-----|--------------------------------------------------------------------------|-----------------|----------|
| 1   | Contenido Natural de Humedad (ASTM D 2216)                               | Suelo           | 66       |
| 2   | Análisis Granulométrico por Tamizado e Hidrómetro (ASTM D 6913 / D 7928) | Suelo           | 3        |
| 3   | Límite Líquido y Plástico (ASTM D 4318)                                  | Suelo           | 3        |
| 4   | Ensayo de Consolidación (ASTM D 2435)                                    | Suelo           | 2        |
| 5   | Ensayo de Hinchamiento y Colapso (ASTM D 4546)                           | Suelo           | 1        |
| 6   | Sulfatos (ASTM D C 1580)                                                 | Suelo           | 1        |
| 7   | Compresión Simple en Roca (ASTM D 7012)                                  | Roca            | 15       |

**4.- RESULTADOS:** El área estudiada está compuesta Sedimentos Holocenos, no diferenciados, principalmente aluvión o relleno.



MAPA GEOLÓGICO DEL ÁREA DE ESTUDIO

|                                                            |    |                                                                          |
|------------------------------------------------------------|----|--------------------------------------------------------------------------|
| Undivided Holocene sediments, principally alluvium or fill | Qa | Sedimentos Holocenos, no diferenciados, principalmente aluvión o relleno |
| Holocene fringing coral reefs                              | Qr | Arrecifes coralíferos Holocenos                                          |

LEYENDA DEL MAPA GEOLÓGICO

En la estratigrafía del sitio se encontró un estrato compuesto por **relleno heterogéneo**, seguido de un estrato de **arena limosa (SM)**, de compacidad suelta a muy suelta, plasticidad baja, contenido natural de humedad media, color gris oscuro, presenta restos de conchas.

Por otro lado, en el Hoyo No.4, se encontró un estrato de **limo elástico con arena (MH)**, consistencia firme a muy firme, plasticidad alta, contenido natural de humedad bajo, color gris oscuro, presenta abundantes conchas.

Seguido de un estrato identificado como **limo arenoso (ML)**, consistencia firme, plasticidad baja, contenido natural de humedad media, color gris oscuro, con abundantes conchas.

A una profundidad de 17.50m (Hoyo No.2), 19.50m (Hoyo No.1), 22.50m (Hoyo No.3), 23.50m (Hoyo No.4) y 23.74m (Hoyo No.5), se identifica un nivel de **roca meteorizada**, constituido por **conglomerado**. Roca poco fracturada. De textura clástica, estructura masiva, con clastos de hasta 15mm de morfología subredondeados, matriz de grano fino, de color chocolate. Dureza: suave a moderadamente suave (RH-1 a RH-2). Fracturas con ángulos de

10° de superficie planas, rugosas, cerradas. El espaciado varías entre 0.60-2.00m. La mineralización existente es: limonita, hematita, calcita.

A profundidades de 18.36m (Hoyo No.2), 20.26m (Hoyo No.1), 23.25m (Hoyo No.3), 24.00m (Hoyo No.4) y 24.30m (Hoyo No.5), se identifica un nivel de **roca sana**, constituido por **conglomerado**. Roca de textura clástica, estructura masiva, con clastos de hasta 40mm de morfología subredondeados, matriz de grano fino, de color gris claro. Dureza: moderadamente suave (RH-2). El espaciado >2.00m. La mineralización existente es: calcita.

El siguiente cuadro muestra el resumen general de resultados obtenidos en las pruebas de laboratorio.

**CUADRO No. 3: RESUMEN GENERAL DE RESULTADOS DE LABORATORIO**

| SONDEO No. | TIPO DE MUESTRA | PROFUNDIDAD<br>(m) | CLASIFICACIÓN S.U.C.S. | CLASIFICACIÓN AASHTO | ÍNDICE DE GRUPO | ANÁLISIS GRANULOMÉTRICO |         |         | LL | LP | IP | CONSOLIDACIÓN |       |       | HINCHAMIENTO |     |
|------------|-----------------|--------------------|------------------------|----------------------|-----------------|-------------------------|---------|---------|----|----|----|---------------|-------|-------|--------------|-----|
|            |                 |                    |                        |                      |                 | %QUE PASA TAMIZ No.     |         |         |    |    |    | σp'           | Cc    | Cs    |              | kPa |
|            |                 |                    |                        |                      |                 | % GRAVA                 | % ARENA | % FINOS |    |    |    |               |       |       |              |     |
| 3          | I               | 21.00 – 21.90      | ML                     | A-7-5                | 7               | 1.90                    | 39.80   | 58.30   | 47 | 33 | 14 | 3.530         | 0.339 | 0.059 | 90           |     |
| 4          | A               | 21.00 – 21.45      | MH                     | A-7-5                | 32              | 0.0                     | 15.8    | 84.2    | 66 | 33 | 33 | -             | -     | -     | -            |     |
| 5          | I               | 18.00 – 18.90      | SM                     | A-2-4                | 0               | 0.0                     | 85.8    | 14.2    | 35 | 25 | 10 | 3.045         | 0.319 | 0.025 | -            |     |

El siguiente cuadro muestra el resumen general de resultados obtenidos en las pruebas de compresión.

**CUADRO No.4: RESUMEN DE RESULTADOS DE COMPRESIÓN**

| SONDEO No. | MUESTRA No. | PROFUNDIDAD (m) |   |       | DESCRIPCIÓN  | DENSIDAD g/cm <sup>3</sup> | ESFUERZO A COMPRESION |       | RQD |
|------------|-------------|-----------------|---|-------|--------------|----------------------------|-----------------------|-------|-----|
|            |             |                 |   |       |              |                            | kg/cm <sup>2</sup>    | MPa   | %   |
| 1          | 1           | 21.10           | - | 21.30 | Conglomerado | 2.02                       | 254.01                | 24.91 | 100 |
|            | 2           | 23.30           | - | 23.50 | Conglomerado | 2.06                       | 218.97                | 21.47 | 100 |

| SONDEO No. | MUESTRA No. | PROFUNDIDAD (m) |   |       | DESCRIPCIÓN  | DENSIDAD g/cm <sup>3</sup> | ESFUERZO A COMPRESION |       | RQD |
|------------|-------------|-----------------|---|-------|--------------|----------------------------|-----------------------|-------|-----|
|            |             |                 |   |       |              |                            | kg/cm <sup>2</sup>    | MPa   | %   |
|            | 3           | 25.80           | - | 26.00 | Conglomerado | 2.03                       | 209.74                | 20.57 | 100 |
| 2          | 1           | 18.90           | - | 19.10 | Conglomerado | 2.51                       | 243.64                | 23.89 | 100 |
|            | 2           | 21.10           | - | 21.30 | Conglomerado | 2.44                       | 141.95                | 13.92 | 100 |
|            | 3           | 23.30           | - | 23.50 | Conglomerado | 2.41                       | 121.71                | 11.94 | 100 |
| 3          | 1           | 24.00           | - | 24.30 | Conglomerado | 2.36                       | 211.08                | 20.70 | 100 |
|            | 2           | 25.70           | - | 25.90 | Conglomerado | 2.38                       | 136.53                | 13.39 | 100 |
|            | 3           | 27.65           | - | 27.85 | Conglomerado | 2.37                       | 74.65                 | 7.32  | 100 |
| 4          | 1           | 24.55           | - | 24.75 | Conglomerado | 2.41                       | 170.34                | 16.70 | 100 |
|            | 2           | 26.70           | - | 26.90 | Conglomerado | 2.43                       | 199.21                | 19.54 | 100 |
|            | 3           | 28.85           | - | 29.05 | Conglomerado | 2.42                       | 158.83                | 15.58 | 100 |
| 5          | 1           | 25.20           | - | 25.40 | Conglomerado | 2.39                       | 226.48                | 22.21 | 100 |
|            | 2           | 27.25           | - | 27.45 | Conglomerado | 2.42                       | 167.49                | 16.42 | 100 |
|            | 3           | 29.40           | - | 29.60 | Conglomerado | 2.41                       | 180.96                | 17.75 | 100 |

El siguiente cuadro muestra el resumen general de resultados obtenidos en los ensayos presiométricos.

**CUADRO No.5: RESUMEN DE RESULTADOS DE PRESIÓMETRO**

| SONDEO No. | PROFUNDIDAD (m) | DESCRIPCIÓN      | MÓDULO PRESIOMÉTRICO DE CARGA $E_{pINICIAL}$ (MPa) | MÓDULO PRESIOMÉTRICO DE CARGA-RECARGA $E_{pCYCLE}$ (MPa) | PRESIÓN DE FLUENCIA $P_y$ (MPa) | PRESIÓN LÍMITE $P_L$ (MPa) |
|------------|-----------------|------------------|----------------------------------------------------|----------------------------------------------------------|---------------------------------|----------------------------|
| 2          | 15.12           | Suelo            | 6                                                  | 12                                                       | 0.40                            | 0.65                       |
|            | 17.96           | Roca Meteorizada | 1036                                               | 1407                                                     | 5.70                            | 10.80                      |
|            | 22.62           | Roca Sana        | 2397                                               | 3960                                                     | >9                              | >18                        |
| 3          | 25.62           | Roca Sana        | 2576                                               | 3808                                                     | 8.20                            | >17                        |

De los resultados obtenidos del ensayo downhole y una vez analizadas las gráficas obtenidas para los diferentes intervalos, se procedió a confeccionar el perfil sísmico del sitio, para el mismo se analizaron las velocidades obtenidas por medición directa, comparándola con el tipo de material y las velocidades que estos normalmente tienen. Con estos valores se obtuvo que la velocidad de onda cortante ( $V_{s30}$ ) fue de 360 m/s.

El siguiente cuadro resume los resultados obtenidos para el ensayo realizado.

**CUADRO No.6: RESUMEN DE RESULTADOS DEL ENSAYO DOWNHOLE**

| DESCRIPCIÓN           | PROFUNDIDAD DE ENSAYO (m) | VP- VELOCIDAD PROMEDIO POR ESTRATO (m/s) | VS- VELOCIDAD PROMEDIO POR ESTRATO (m/s) |
|-----------------------|---------------------------|------------------------------------------|------------------------------------------|
| Material de relleno   | 0.00-15.00                | 736.48                                   | 323.30                                   |
| Boulders              | 16.00                     | 995.35                                   | 426.85                                   |
| Arena Limosa          | 17.00-20.22               | 698.16                                   | 340.18                                   |
| Limo elástico arenoso | 21.00-23.00               | 796.11                                   | 217.74                                   |
| Roca meteorizada      | 24.00-24.19               | 997.97                                   | 450.88                                   |
| Roca sana             | 25.00-30.00               | 1409.12                                  | 872.15                                   |

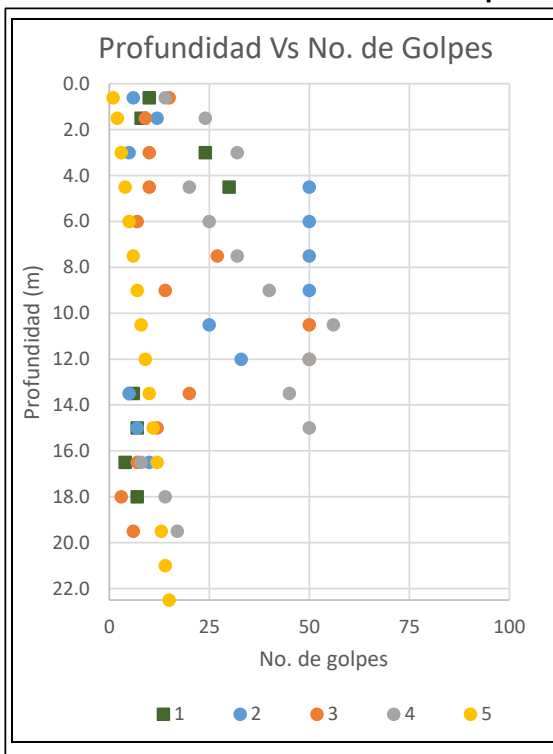
El siguiente cuadro muestra el resumen general de resultados obtenidos en las pruebas de placa.

**CUADRO No.7: RESUMEN DE ENSAYOS DE PLACA**

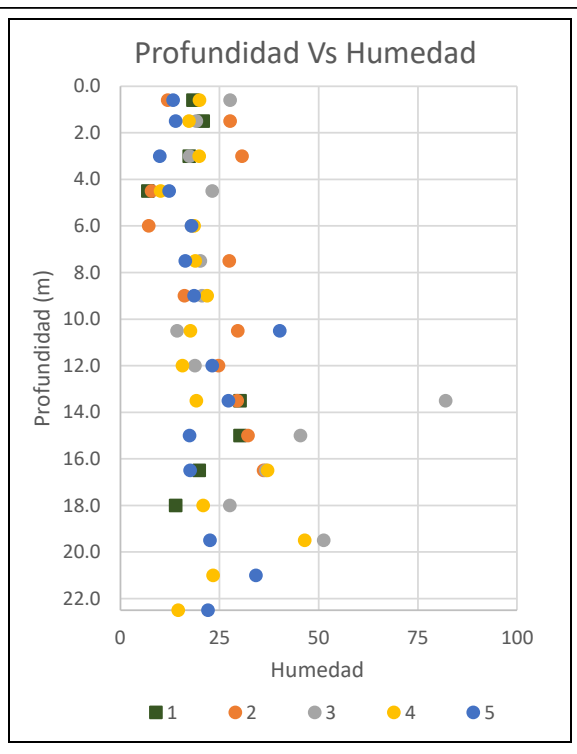
| ENSAYO No. | CARGA MÁXIMA APLICADA (kg) | DEFORMACIÓN (mm) | MÓDULO DE REACCIÓN ( $\text{kN/m}^3$ ) |
|------------|----------------------------|------------------|----------------------------------------|
| PP1        | 18 092                     | 6.020            | 69 291                                 |
| PP2        | 18 092                     | 8.280            | 48 819                                 |
| PP3        | 18 092                     | 9.068            | 90 551                                 |

En los siguientes gráficos se muestran los porcentajes de humedad de las muestras obtenidas en sitio, el número de golpes por sondeo de la prueba de penetración estándar (SPT).

**Grafica N°1: Profundidad Vs N.º de Golpes**

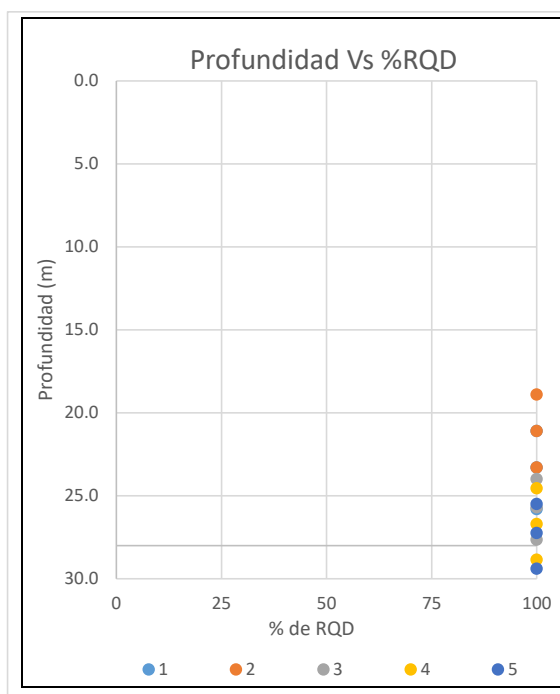


**Grafica N°2: Profundidad Vs % de Humedad**

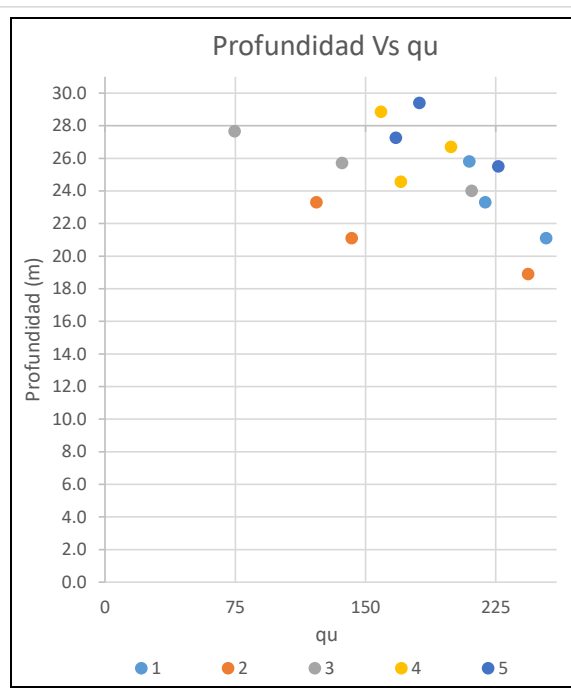


En las gráficas siguientes se muestra la variación del RQD y los resultados de los ensayos de compresión simple en función de la profundidad.

**Grafica N°3: Profundidad vs % RQD**



**Grafica N°4: Profundidad vs Esfuerzo Máximo**



**5.- POTENCIAL DE LICUACIÓN:** Utilizando los resultados del ensayo SPT en el programa Settle3D, se calcula la probabilidad de licuación usando un factor de seguridad de 1. Para el potencial de licuación se consideró lo siguiente:

- Todo material por arriba del nivel freático, no licua.
- El nivel freático fue considerado a 12.4m de profundidad según se registró en el sondeo no. 1.
- Se utilizará el sondeo No. 5 para definir la estratigrafía ya que presenta un mayor estrato de suelo y una menor cantidad de golpes de los ensayos SPT.
- Una aceleración máxima del sitio (PGA) de 0.67g para un sismo de magnitud 5.8.

Para determinar el potencial de licuación del suelo se debe definir la relación del esfuerzo cíclico (CSR o Cyclic Stress Ratio). El CSR según Seed & Idriss (1971) se define como el esfuerzo cortante cíclico promedio que se desarrolla en el plano horizontal del perfil estratigráfico producto de la propagación vertical de las ondas de corte, normalizado por el esfuerzo inicial vertical, para incorporar el incremento de la resistencia al corte debido al incremento a la tensión efectiva.

Utilizando el programa de computador Settle3D, se introducen una serie de valores según el procedimiento a utilizar. Se estima el CSR a partir de la aceleración pico del suelo (PGA), las tensiones efectivas y totales del suelo y un factor de reducción,  $r_d$ . Por otro lado, se define la relación de resistencia cíclica (CRR) a partir de los resultados del SPT, multiplicándolo por un factor escalado a la magnitud del sismo considerado (MSF o Magnitud Scaling Factor) de ser necesario.

Una vez estimada la relación de resistencia cíclica (CRR o Cyclic Resistance Ratio) se puede comparar con el CSR para obtener un Factor de Seguridad (FS) ante la licuación.

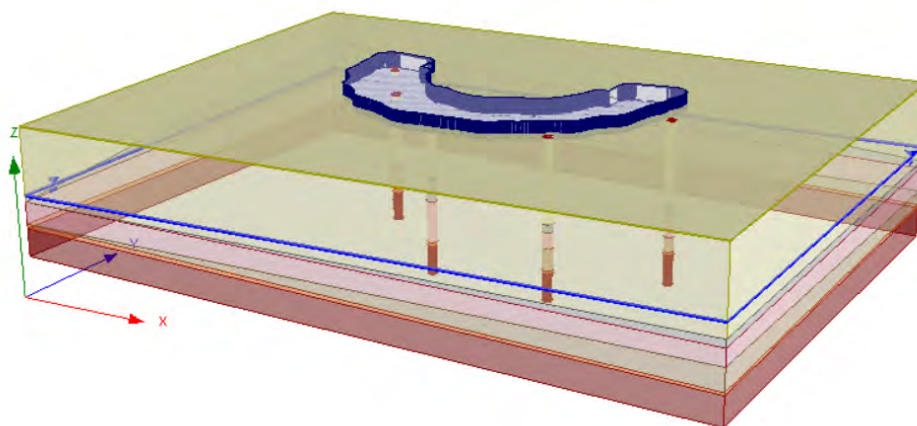
Como resultado, se obtiene una franja licuable aproximada 4.50m de espesor, que va desde una profundidad de 16.5m a 21.0m y un asentamiento que según diferentes autores puede variar desde 0.00 a 20cm. Los resultados pueden observarse detalladamente en el Apéndice “A”, “**Potencial de Licuación**”.

**6.- ANÁLISIS DE ASENTAMIENTOS:** El análisis de asentamientos se ha realizado considerando los siguientes puntos:

- Para la estratigrafía se consideraron todos los sondeos.
- El nivel freático fue considerado a 12.4m de profundidad según se registró en el sondeo no. 1.
- Se realizaron ensayos de consolidación a muestras inalteradas para conocer el comportamiento del suelo a largo plazo.
- Los módulos elásticos se obtuvieron correlacionando los valores de los ensayos de SPT realizados en los sondeos.
- Los asentamientos se calculan considerando una losa de cimentación tipo MAT con un área aproximada de 1216 m<sup>2</sup>.
- La carga asumida utilizada fue de 80 kPa (8,000 kg/m<sup>2</sup>).
- La dimensión de la losa de cimentación fue asumida como la huella del edificio.
- Se consideró una profundidad de desplante de 1.00m desde el nivel en que se realizaron las perforaciones.

La modelación de los asentamientos se realizó utilizando el programa de computador desarrollado por Rocscience – Settle3D.

**6.1.- RESULTADOS:** Teniendo en cuenta lo mencionado en el apartado anterior, a continuación, se puede observar la estratigrafía considerada y los parámetros del suelo contemplados en los cálculos.



**FIGURA No.2: MODELO 3D (ESTRATIGRAFÍA Y CARGA)**

| Material Name              | Color                                                                             | Unit Weight (kN/m <sup>3</sup> ) | Sat. Unit Weight (kN/m <sup>3</sup> ) | Es (kPa) | Eur (kPa) | Material Type | Cc    | Cr    | Pc (kPa) | e0    |
|----------------------------|-----------------------------------------------------------------------------------|----------------------------------|---------------------------------------|----------|-----------|---------------|-------|-------|----------|-------|
| Releno                     |  | 17                               | 18                                    | 30000    | 30000     | Non-Linear    | 0.319 | 0.025 | 298      | 1.411 |
| Boulders                   |  | 18                               | 18.5                                  | 95000    | 95000     | -             | -     | -     | -        | -     |
| Arena Limosa, Limo Arenoso |  | 15.7                             | 16.7                                  | 17000    | 17000     | Non-Linear    | 0.319 | 0.025 | 298      | 1.411 |
| Limo Elastico con arena    |  | 16.8                             | 17.8                                  | 8000     | 8000      | Non-Linear    | 0.339 | 0.059 | 346      | 1.322 |
| Roca Meteorizada           |  | 21                               | 21.5                                  | -        | -         | -             | -     | -     | -        | -     |
| Roca Sana                  |  | 23                               | 23.5                                  | -        | -         | -             | -     | -     | -        | -     |

**FIGURA No.3: ESTRATIGRAFÍA Y PARÁMETROS DEL SUELO CONSIDERADOS**

Finalizado los modelos, se procede a realizar el cálculo de asentamientos con el programa Settle3D en el que se consideran deformaciones unidimensionales en la dirección vertical, basándose en un comportamiento elástico lineal del material donde se introducen los parámetros de deformación del suelo ( $E_s$  y  $E_{sur}$ ) y tensiones efectivas para sus asientos instantáneos. Adicionalmente se calculan los asentamientos por consolidación primaria considerando un material no lineal a diferencia de los asentamientos instantáneos.

Se estima un asentamiento total de **89.3mm**, el cual está por encima del asentamiento tolerable para suelos arcillosos según el REP 2021 de 50.00mm.

En el Apéndice “B”, “**Análisis de Asentamientos**”, se pueden observar los resultados obtenidos en la modelación.

## 7.- ANÁLISIS DE CAPACIDAD DE SOPORTE PARA PILOTES

Utilizando el programa RSPile se llevó a cabo un análisis de capacidad de soporte, considerando pilotes de 1.00m, 1.20m y 1.50m de diámetro. Basándose en lo observado de las perforaciones, se define la estratigrafía tomando como referencia todos los sondeos.

Se define una estratigrafía horizontal tomando en consideración las perforaciones mencionadas y se procede a crear un elemento vertical para modelar cada pilote. Se asumió la cabeza del pilote desde el nivel del terreno. Para definir la longitud del pilote se tomó como referencia el Sondeos No. 5, que presenta una mayor profundidad a la roca sana. Considerando un empotramiento en roca sana de tres (3) veces el diámetro del pilote se obtienen longitudes de 27m, 28m y 29m de pilote.

Se utilizó una resistencia del concreto para los pilotes de  $f'_c = 350 \text{ kg/cm}^2$ .

Las capacidades de soporte para los pilotes perforados y vaciados 'insitu' se resumen en el siguiente cuadro:

**CUADRO No.8: RESULTADOS DE CAPACIDAD DE SOPORTE ÚLTIMA PARA PILOTES PERFORADOS**

| DIÁMETRO<br>(m) | CAPACIDAD DE CARGA<br>ÚLTIMA EN FRICCIÓN O<br>FUSTE |      | CAPACIDAD DE CARGA<br>ÚLTIMA EN PUNTA |       | CAPACIDAD DE CARGA<br>ÚLTIMA TOTAL |       |
|-----------------|-----------------------------------------------------|------|---------------------------------------|-------|------------------------------------|-------|
|                 | kN                                                  | TON  | kN                                    | TON   | kN                                 | TON   |
| 1.00            | 19902                                               | 2237 | 78540                                 | 8828  | 98442                              | 11065 |
| 1.20            | 30293                                               | 3405 | 113097                                | 12713 | 143390                             | 16118 |
| 1.50            | 45876                                               | 5157 | 176715                                | 19864 | 225591                             | 25357 |

Es importante señalar que las capacidades presentadas en los cuadros son capacidades últimas y no admisibles. Por lo tanto, será necesario aplicar un factor de seguridad, que varía entre 2 y 4 según el REP 2021, para obtener valores de capacidad de carga admisible.

En el Apéndice "C", "**Análisis de Capacidad de Soporte para Pilotes**", se pueden observar los resultados de las modelaciones en donde se detallan los valores de capacidades últimas por fuste, capacidades últimas por punta, capacidad última total (sin factorar).

## **8.- ANÁLISIS AXIAL DE PILOTES**

El análisis axial de los pilotes se realiza asumiendo una carga (P) obtenida de la capacidad de soporte en punta dividida por un factor de seguridad de 3.

Nuevamente, utilizando el programa de computadora RSPile, se aplica la carga axial mencionada para evaluar los asentamientos, la respuesta del suelo y la distribución de la carga axial a lo largo del pilote y en la punta del mismo. En el siguiente cuadro se resumen las cargas, utilizadas para el cálculo y el asentamiento que se espera para un (1) pilote.

**CUADRO No.9: CONDICIÓN CARGA P, ASENTAMIENTOS OBTENIDOS POR PILOTE**

| DIÁMETRO (m) | CARGA P |      | ASENTAMIENTO (cm) |
|--------------|---------|------|-------------------|
|              | kN      | TON  |                   |
| 1.00         | 26180   | 2943 | 3.652             |
| 1.20         | 37699   | 4238 | 3.867             |
| 1.50         | 58905   | 6621 | 4.167             |

En el Apéndice “D”, “**Análisis Axial de Pilotes**”, se pueden observar los resultados de las modelaciones en donde se detallan los valores de asentamiento y la distribución de carga por fuste y por punta.

## **9.- ANÁLISIS LATERAL DE PILOTES**

Se realizó un análisis de carga lateral para cada pilote, en donde se impone un desplazamiento de 5mm en la parte superior del pilote para estudiar la rigidez lateral del suelo ante esta condición, también se obtienen las curvas p-y que representan la evolución de la resistencia lateral del suelo a medida que aumentan sus deformaciones en función de su profundidad. El pilote se analizó en condición de cabeza empotrada.

Para el análisis lateral de pilotes es necesario definir la resistencia al corte sin drenaje ( $S_u$ ) para los suelos arcillosos y el módulo de deformación para suelos arenosos. De esta forma, se puede conocer la respuesta lateral del suelo ante el desplazamiento impuesto. Estos parámetros, la resistencia al corte sin drenaje para suelos arcillosos y el módulo de deformación para los suelos arenosos de los ensayos SPT. Adicional para definir los estratos de roca se realizaron pruebas presiométricos y clasificación geomecánica.

En el Apéndice “E”, “**Análisis Lateral de Pilotes**”, se pueden observar los resultados detalladamente, donde se muestra las rigideces laterales o módulos de reacción horizontal en función de la profundidad y el tipo de material, las curvas p-y a cada metro de profundidad, los cortantes y momentos del pilote.

## 10.- ANÁLISIS DE RESPUESTA SÍSMICA DE SITIO

Espectro de Diseño Metodología REP-2021 (ASCE-07).

El espectro de respuesta sísmico obtenido para el proyecto se basó en el Capítulo 5 del REP-2021. Los resultados del ensayo Downhole presenta una velocidad de respuesta del suelo promedio de 362 m/s o 1187 ft/s y según la Tabla 20.3-1 de Cargas de Diseño Mínimas para Edificios y otras Estructuras (Minimum Design Loads for Buildings and Other Structures) ASCE/SEI 7-05, el sitio se clasifica como sitio clase C “Suelo muy denso y roca blanda”. Los resultados del downhole obtenido son significativos y coherente con el conjunto de perfiles de suelo encontrados.

TABLE 20.3-1 SITE CLASSIFICATION

| Site Class                                                                | $v_p$                                                                                                                                                                                                                           | $N$ or $N_{60}$ | $\bar{s}_u$        |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------|
| A. Hard rock                                                              | $>5,000$ ft/s                                                                                                                                                                                                                   | NA              | NA                 |
| B. Rock                                                                   | 2,500 to 5,000 ft/s                                                                                                                                                                                                             | NA              | NA                 |
| C. Very dense soil and soft rock                                          | 1,200 to 2,500 ft/s                                                                                                                                                                                                             | $>50$           | $>2,000$ psf       |
| D. Stiff soil                                                             | 600 to 1,200 ft/s                                                                                                                                                                                                               | 15 to 50        | 1,000 to 2,000 psf |
| E. Soft clay soil                                                         | $<600$ ft/s                                                                                                                                                                                                                     | $<15$           | $<1,000$ psf       |
| F. Soils requiring site response analysis in accordance with Section 21.1 | Any profile with more than 10 ft of soil having the following characteristics:<br>Plasticity index $PI > 20$ ,<br>Moisture content $w \geq 40\%$ , and<br>Undrained shear strength $\bar{s}_u < 500$ psf.<br>See Section 20.3.1 |                 |                    |

For SI: 1 ft/s = 0.3048 m/s 1 lb/ft<sup>2</sup> = 0.0479 kN/m<sup>2</sup>

Una vez clasificado el sitio (Sitio Clase C) se obtienen las aceleraciones espectrales ( $S_s$  y  $S_1$  respectivamente) segundos a 5% de amortiguamiento Crítico de los mapas de aceleraciones encontrados en el REP-2021.

Aceleración Espectral Máxima (PGA)/5% de Amortiguamiento Crítico= **0.70g**.

Aceleración Espectral de 1.0 seg ( $S_1$ )/5% de Amortiguamiento Crítico= **0.60g**.

Aceleración Espectral 0.2 seg ( $S_s$ )/5% de Amortiguamiento Crítico de= **1.80g**.

Con estas aceleraciones y el tipo de sitio, anteriormente definido, se utilizan las tablas 11.4-1 y 11.4-2 de Cargas de Diseño Mínimas para Edificios y otras Estructuras (Minimum Design Loads for Buildings and Other Structures) ASCE/SEI 7-05, para obtener los coeficientes de sitio ( $F_a$  y  $F_v$ ).

TABLE 11.4-1 SITE COEFFICIENT,  $F_a$ 

| Site Class | Mapped Maximum Considered Earthquake Spectral Response Acceleration Parameter at Short Period |             |              |             |                 |
|------------|-----------------------------------------------------------------------------------------------|-------------|--------------|-------------|-----------------|
|            | $S_s \leq 0.25$                                                                               | $S_s = 0.5$ | $S_s = 0.75$ | $S_s = 1.0$ | $S_s \geq 1.25$ |
| A          | 0.8                                                                                           | 0.8         | 0.8          | 0.8         | 0.8             |
| B          | 1.0                                                                                           | 1.0         | 1.0          | 1.0         | 1.0             |
| C          | 1.2                                                                                           | 1.2         | 1.1          | 1.0         | 1.0             |
| D          | 1.6                                                                                           | 1.4         | 1.2          | 1.1         | 1.0             |
| E          | 2.5                                                                                           | 1.7         | 1.2          | 0.9         | 0.9             |
| F          | See Section 11.4.7                                                                            |             |              |             |                 |

NOTE: Use straight-line interpolation for intermediate values of  $S_s$ .

$$F_a = 1.00$$

TABLE 11.4-2 SITE COEFFICIENT,  $F_v$ 

| Site Class | Mapped Maximum Considered Earthquake Spectral Response Acceleration Parameter at 1-s Period |             |             |             |                |
|------------|---------------------------------------------------------------------------------------------|-------------|-------------|-------------|----------------|
|            | $S_1 \leq 0.1$                                                                              | $S_1 = 0.2$ | $S_1 = 0.3$ | $S_1 = 0.4$ | $S_1 \geq 0.5$ |
| A          | 0.8                                                                                         | 0.8         | 0.8         | 0.8         | 0.8            |
| B          | 1.0                                                                                         | 1.0         | 1.0         | 1.0         | 1.0            |
| C          | 1.7                                                                                         | 1.6         | 1.5         | 1.4         | 1.3            |
| D          | 2.4                                                                                         | 2.0         | 1.8         | 1.6         | 1.5            |
| E          | 3.5                                                                                         | 3.2         | 2.8         | 2.4         | 2.4            |
| F          | See Section 11.4.7                                                                          |             |             |             |                |

NOTE: Use straight-line interpolation for intermediate values of  $S_1$ .

$$F_v = 1.30$$

Ya encontrados los coeficientes de sitio  $F_a$  y  $F_v$ , se ajustan los parámetros de aceleración de respuesta espectral de periodos cortos ( $S_{MS}$ ) y a 1 segundo ( $S_{M1}$ ), para el tipo de sitio, utilizando las siguientes formulaciones:

$$S_{MS} = F_a \cdot S_s = 1.80$$

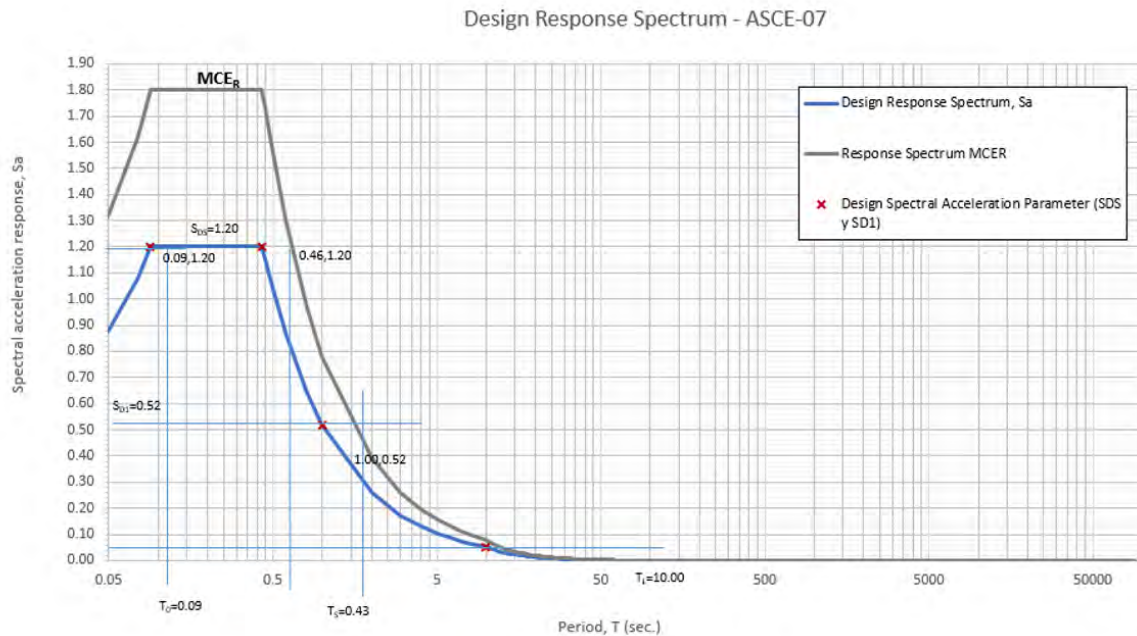
$$S_{M1} = F_v \cdot S_1 = 0.78$$

Estos parámetros de aceleración ajustados ( $S_{MS}$  y  $S_{M1}$ ) se usan para determinar los parámetros de aceleración espectral de diseño  $S_{DS}$  y  $S_{D1}$ .

$$S_{DS} = 2/3 \cdot S_{MS} = 1.20$$

$$S_{D1} = 2/3 \cdot S_{M1} = 0.52$$

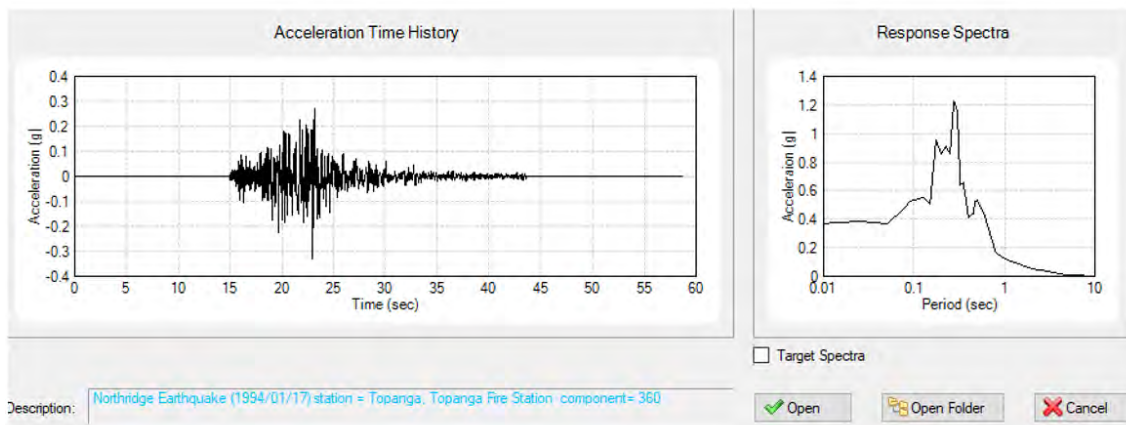
Finalmente, con todos lo anterior definido, se procede a graficar la curva del espectro de respuesta de diseño según el apartado 11.4.5 de Cargas de Diseño Mínimas para Edificios y otras Estructuras (Minimum Design Loads for Buildings and Other Structures) ASCE/SEI 7-05.



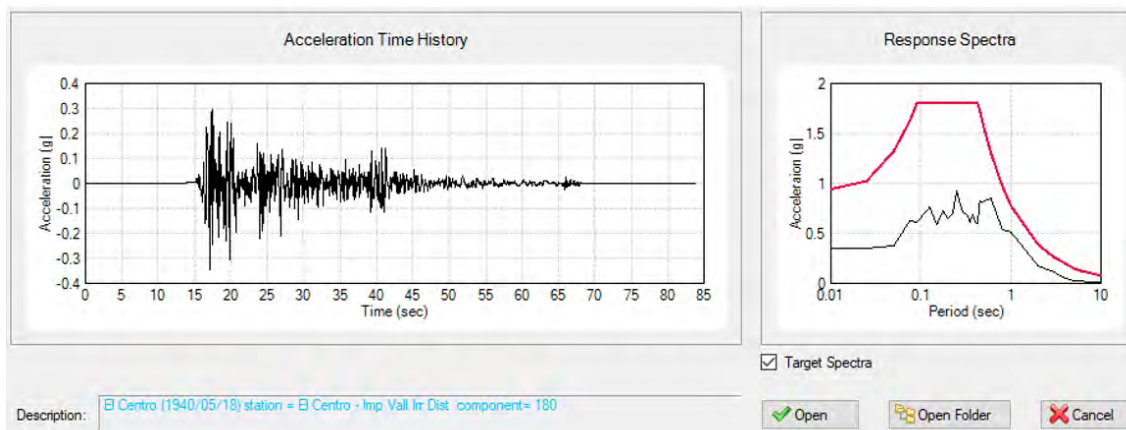
**FIGURA No.2: ESPECTRO DE DISEÑO DE RESPUESTA SÍSMICA – ASCE-07**

### Espectro de Diseño Método Determinístico

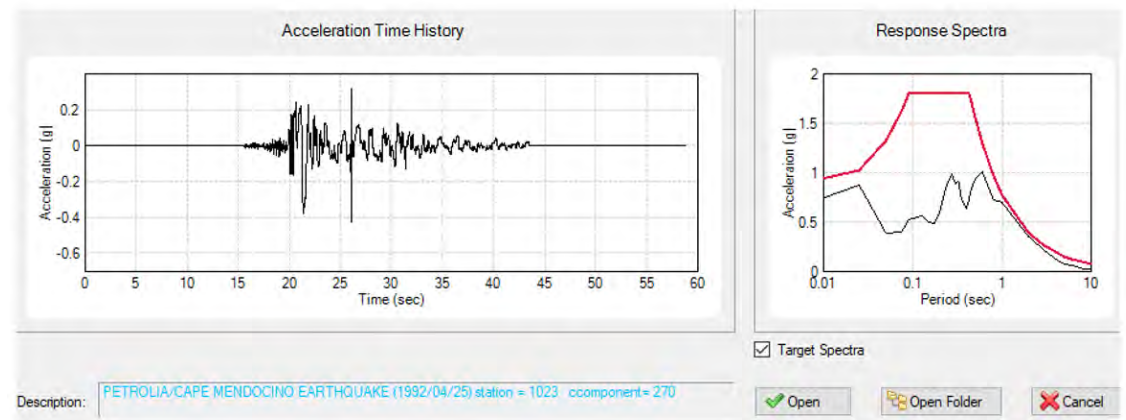
El sismo de magnitud 5.8 con epicentro a 21 Km al noroeste de Contadora (1971/01/19) es el máximo registrado en cercanía del proyecto. Se tomará en consideración de los sismos Northridge (1994/01/17) de magnitud 6.7, El Centro (1940/05/10) de magnitud 6.9, y Petrolia Cape Mendocino (1992/04/25) de magnitud 7.2 para modelar el comportamiento del sismo de repuesta, utilizando como objetivo el espectro de respuesta del obtenido en el ASCE-07. Se utilizará el software PROSHAKE, con la información de los perfiles de suelos y el resultado de la velocidad de onda Vs obtenida del ensayo downhole, para obtener la envolvente del espectro de respuesta.



**GRÁFICA No.5: ESPECTRO DE RESPUESTA – NORTHRIDGE (1994/01/17)**

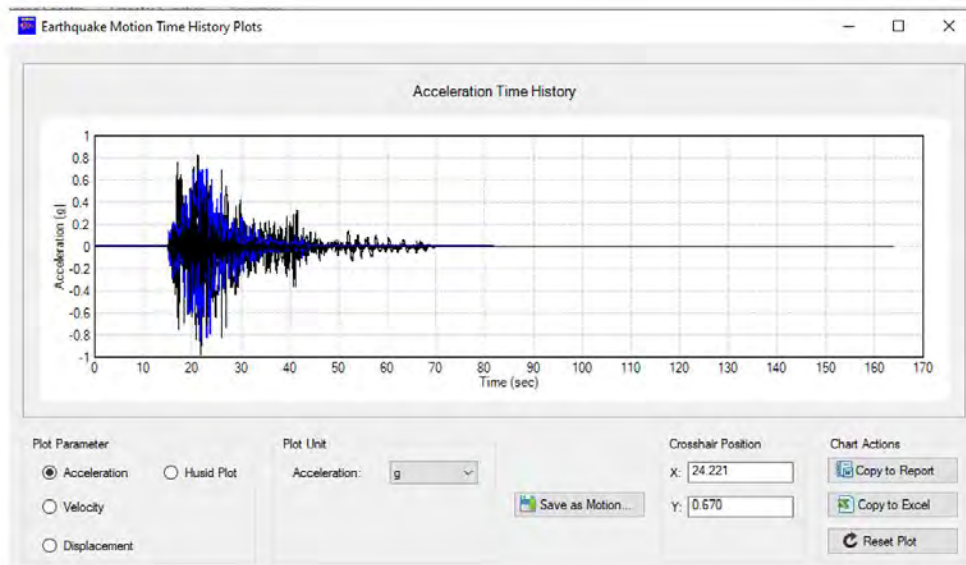
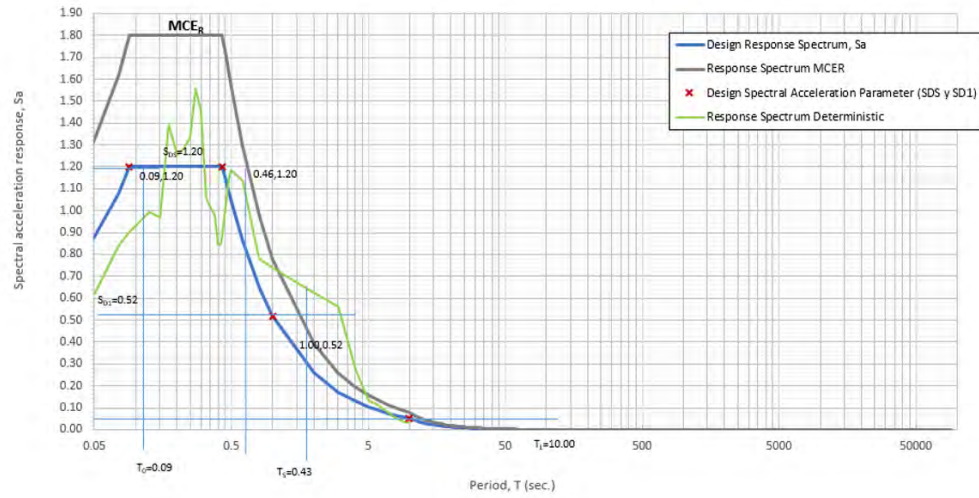


**GRÁFICA No.6: ESPECTRO DE RESPUESTA – EL CENTRO (1940/05/10)**



**GRÁFICA No.7: ESPECTRO DE RESPUESTA – PETROLIA CAPE MENDOCINO (1992/04/25)**

Design Response Spectrum - ASCE-07



GRÁFICA No.8: PARÁMETROS DE ACELERACIÓN OBTENIDOS

**11.- RECOMENDACIONES:** En base a los resultados de la investigación indicamos lo siguiente:

- Señalamos que, para este reporte, todas las profundidades están en función del nivel en donde iniciaron cada una de las perforaciones al momento de realizar el estudio.
- Como primera opción se recomienda el uso de pilotes perforados y vaciados en sitio con un empotramiento mínimo de tres (3) veces el diámetro del pilote dentro de la roca sana, a la cual se le asigna una capacidad de soporte admisible en punta de 500,000 kg/m<sup>2</sup> y por fuste de 50,000 kg/m<sup>2</sup>.
- Se recomienda que el diseñador utilice la información presentada en el “Apéndice C”, dado que dependiendo del diámetro de cada pilote la capacidad de soporte va incrementando. Importante señalar que los valores presentados en dicho apéndice son valores últimos por lo que requieren la aplicación de un factor de seguridad.
- El cliente ha solicitado analizar la opción de una losa de cimentación (mat) se recomienda diseñar para una capacidad de soporte admisible de 8,000 kg/m<sup>2</sup> a una profundidad de desplante de 1.00m y un módulo de reacción del suelo (ks) de 1100 kN/m<sup>3</sup>, sin embargo, para esta opción se obtiene un asentamiento total de **89.3mm**, el cual está por encima del asentamiento tolerable para suelos arcillosos según el REP 2021 de 50.00mm. Por lo que será necesario realizar un mejoramiento de suelos mediante columnas de modulo controlado o columnas de grava, cuyo uso no consideramos viable debido a los materiales que conforman el relleno. Esto se debe a la presencia de estrato licuable que se indica a continuación.
- Se obtiene una franja licuable aproximada de 4.50m de espesor, que va desde una profundidad de 16.5m a 21.0m. Para mitigar los efectos de la licuación se recomienda un mejoramiento suelos o utilizar la opción de cimentaciones profundas.
- Cualquier cambio en los parámetros presentados para el análisis de asentamientos invalida los resultados presentados y obliga a realizar una revisión de los mismos.
- El suelo presenta una presión de hinchamiento de 90.0 kPa lo que corresponde a un potencial de expansión bajo y no presenta problemas de colapso.
- En base a los resultados obtenidos de los análisis químicos de sulfatos a muestras de suelo, con valores entre 0.052014%, no se requiere ningún tipo de restricción para el uso de material cementante y/o aditivos, de acuerdo a la información indicada en la norma ACI 318S-08 (Tabla 4.2.1).

- Es de suma importancia que se recojan las aguas superficiales y se lleven hasta conectarlas al sistema pluvial del sitio; se deberá evitar en todo momento empozamientos de agua dentro del terreno.
- Según los resultados obtenidos del ensayo Downhole, y con la información obtenida del análisis de respuesta sísmica (Método Determinístico), se clasifica el tipo de Perfil del Suelo de este sitio como Tipo “C”, se ubican los siguientes contornos isosísmicos:

Aceleración Pico del Suelo (PGA)/ 5% de Amortiguamiento Crítico 0.67g.

Aceleración Espectral de 1.0 seg (S1) / 5% de Amortiguamiento Crítico 0.73g.

Aceleración Espectral de 0.2 seg (Ss)/ 5% de amortiguamiento Crítico 1.56g.

Las ordenadas del espectro de diseño de respuesta MCE (Determinístico), cumple con lo establecido, y no será menos del 80% de las ordenadas al comparar los valores máximos de los MCE (Determinístico/REP-2021) ASCE-07, verificado al comparar los valores máximos de los MCE (Determinístico/REP-21= $1.56/1.80g=0.866 \times 100=86.6\%$  el cual se encuentra por encima del 80%).

- En el caso que se requiera realizar excavaciones en el sitio durante la construcción del proyecto, se deberá cumplir con todos los requisitos que apliquen de la sección 6 “Control de Excavaciones” del Reglamento Estructural de la República de Panamá, versión 2021.
- Cabe resaltar que la validez de este reporte dependerá de la adopción de las prácticas y del sistema constructivo apropiado para el tipo de cimentaciones propuestas, a ser colocadas en los estratos del subsuelo encontrados, además de la debida inspección de los trabajos de cimentación. Todo esto dentro de las mejores prácticas de la ingeniería y utilizando personal idóneo, además de los debidos controles de calidad.
- Es necesario que se entregue copia de este informe tanto al diseñador como al contratista de cimentaciones, a fin de que puedan hacer una completa evaluación de las condiciones encontradas en el sitio, que les permita el mejor aprovechamiento para el diseño, organización y ejecución de los trabajos.

**12.- APÉNDICES:** Se adjuntan los siguientes apéndices:

- Apéndice "A": Potencial de Licuación (3 hojas);
- Apéndice "B": Análisis de Asentamientos (3 hojas);
- Apéndice "C": Análisis de Capacidad de Soporte para Pilotes (14 hojas);
- Apéndice "D": Análisis Axial de Pilotes (13 hojas);
- Apéndice "E": Análisis Lateral de Pilotes (13 hojas);
- Apéndice "F": Curvas - PY (19 hojas);
- Apéndice "G": Detalle de Localización (2 hojas);
- Apéndice "H": Ensayo Downhole (3 hojas);
- Apéndice "I": Perfiles de Perforación (17 hojas);
- Apéndice "J": Estratigrafía (1 hoja);
- Apéndice "K": Datos Sobre Testigos de Roca (5 hojas);
- Apéndice "L": Ensayo Presiométrico (8 hojas);
- Apéndice "M": Pruebas de Laboratorio (64 hojas);
- Apéndice "N": Pruebas de Placas (6 hojas);
- Apéndice "O": Fotografías (1 hoja);

**TECNILAB, S. A.**

Bruno R. Barranco J.

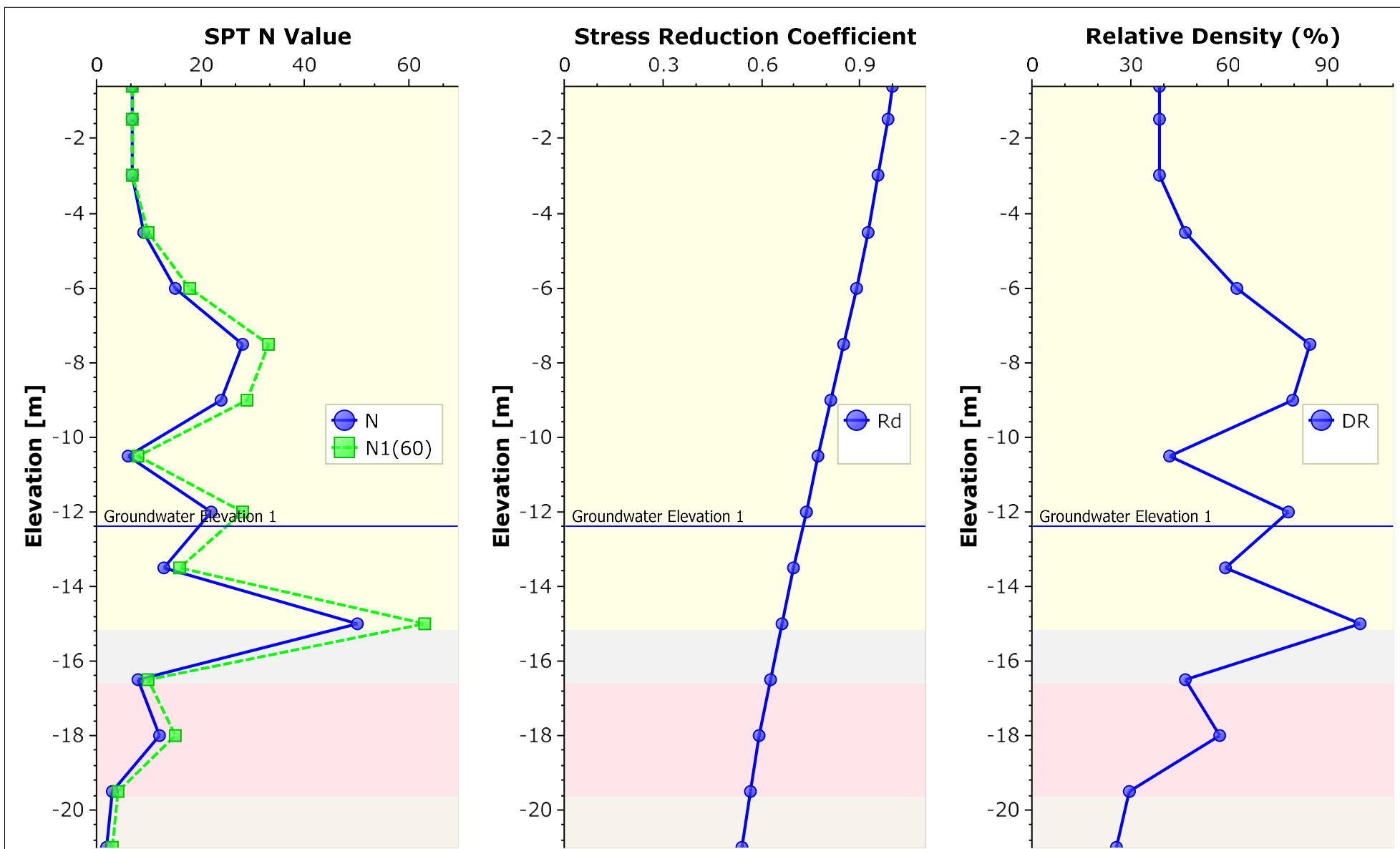
Ingeniero Civil

BRBJ/ah. 24.03-153  
Adj.: Apéndices (15)  
c.c.: Archivo No. 2-1259

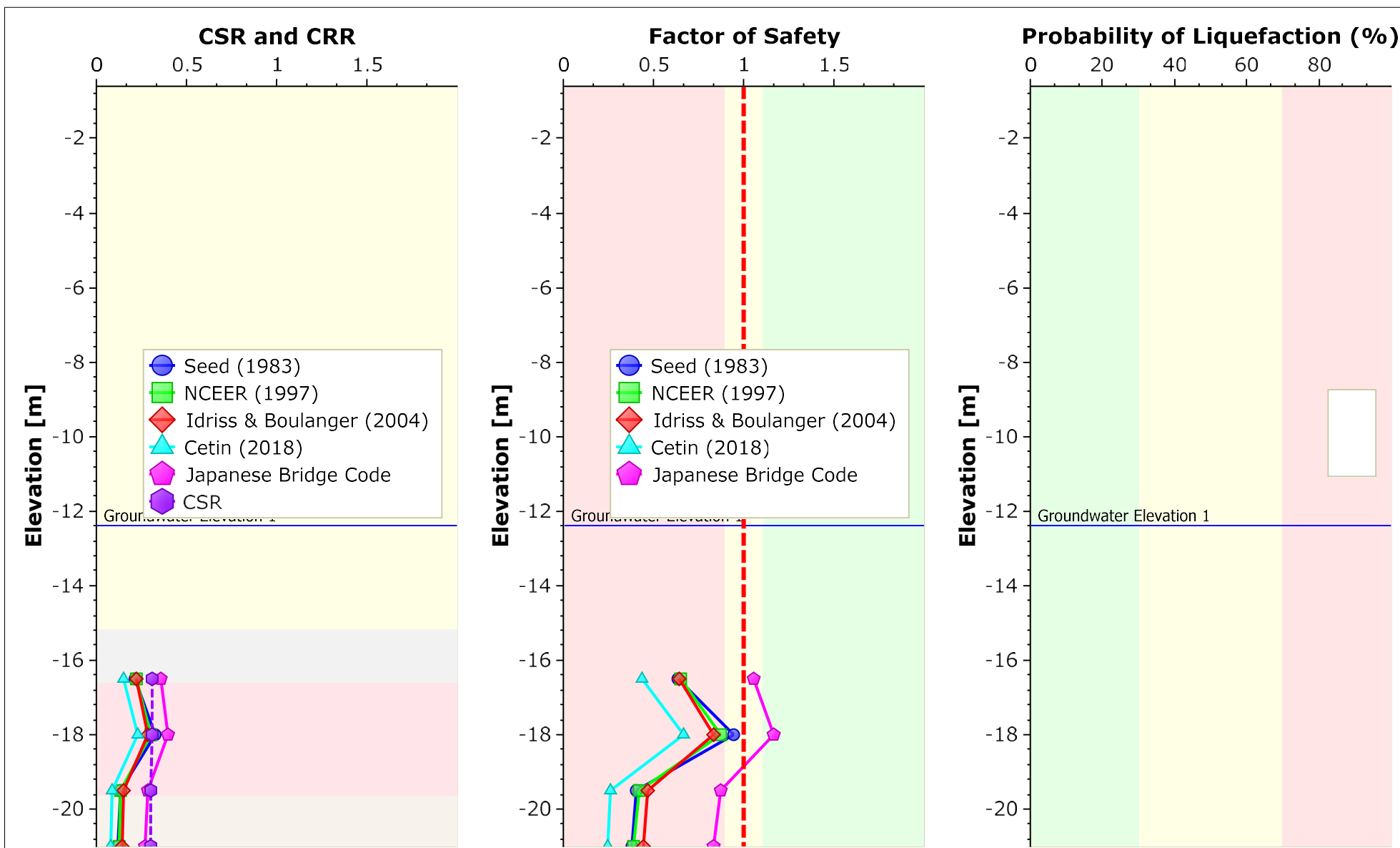


**APENDICE A**  
**POTENCIAL DE LICUACION**

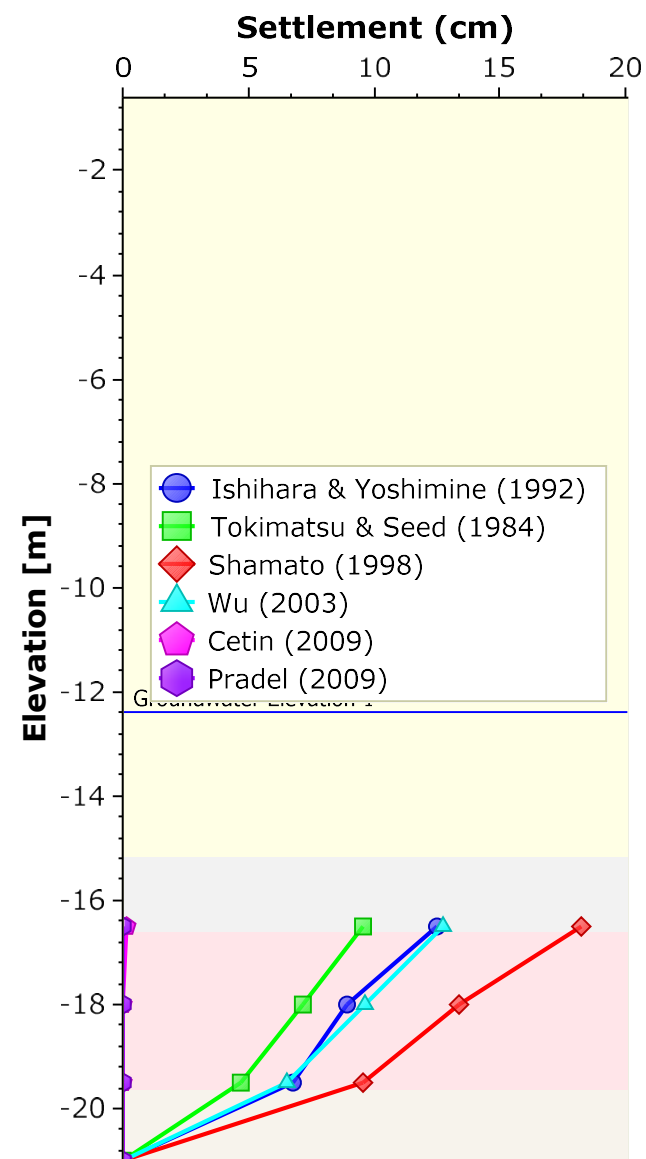
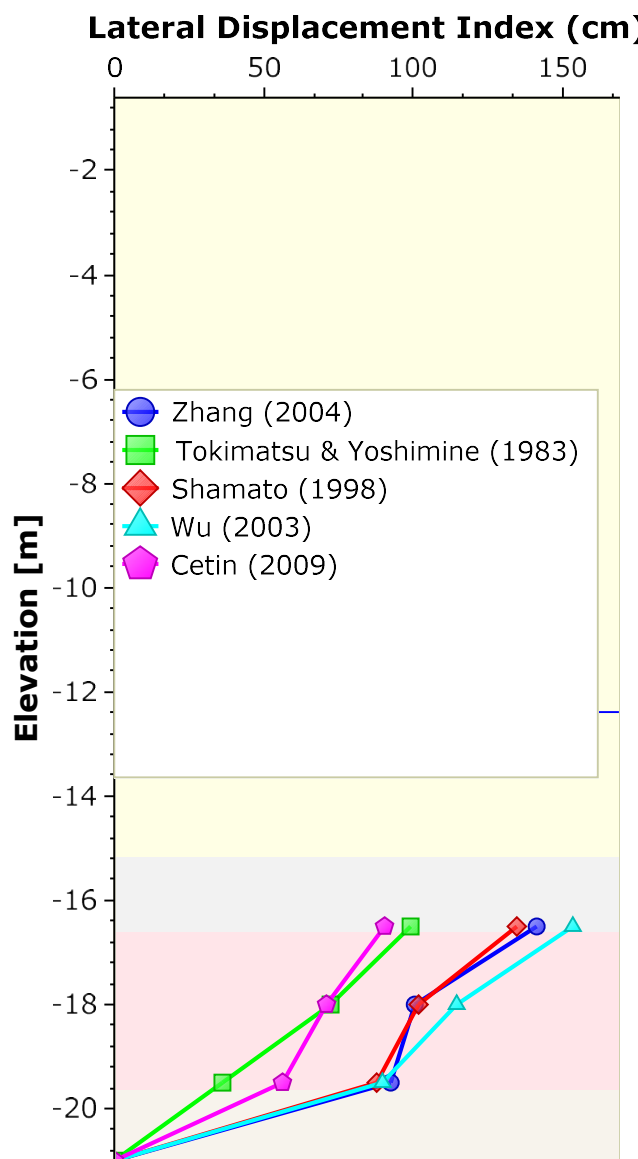
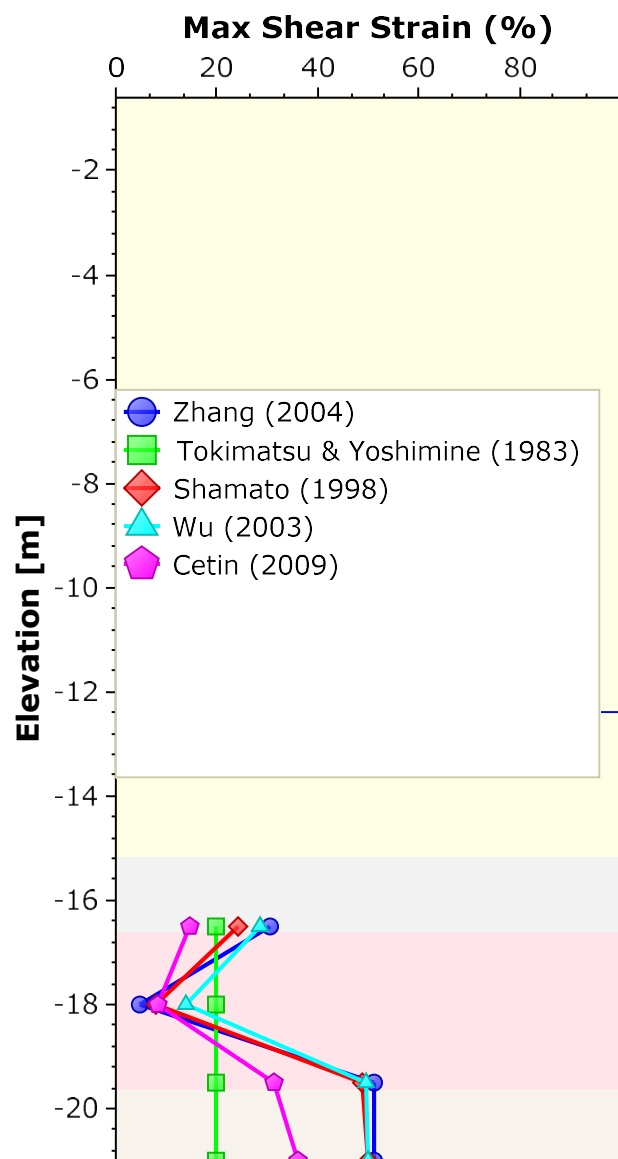
**TECNILAB, S. A.**



|                                                                                                                                                                                                                                                           |                      |  |                          |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|--------------------------|---------------------------|
|  <b>TECNILAB, S. A.</b><br><small>FUNDADA EN 1973</small><br><small>UNA EMPRESA E. BARRANCO Y ASOC., S. A.</small><br><small>LABORATORIO DE SUELOS Y MATERIALES</small> | Project              |  | CARAVOSA                 |                           |
|                                                                                                                                                                                                                                                           | Analysis Description |  | Potencial de Licuacion   |                           |
|                                                                                                                                                                                                                                                           | Drawn By             |  | A. Andrew                | Company<br>Tecnilab, S.A. |
|                                                                                                                                                                                                                                                           | Date                 |  | 03/25/2024 1:47:07 p. m. | Comentarios               |



|                                                                                                                                                                                                                                                           |                      |  |                          |                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|--------------------------|---------------------------|
|  <b>TECNILAB, S. A.</b><br><small>FUNDADA EN 1973</small><br><small>UNA EMPRESA E. BARRANCO Y ASOC., S. A.</small><br><small>LABORATORIO DE SUELOS Y MATERIALES</small> | Project              |  | CARAVOSA                 |                           |
|                                                                                                                                                                                                                                                           | Analysis Description |  | Potencial de Licuacion   |                           |
|                                                                                                                                                                                                                                                           | Drawn By             |  | A. Andrew                | Company<br>Tecnilab, S.A. |
|                                                                                                                                                                                                                                                           | Date                 |  | 03/25/2024 1:47:17 p. m. | Comentarios               |



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

Project

CARAVOSA

Analysis Description

Potencial de Licuacion

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

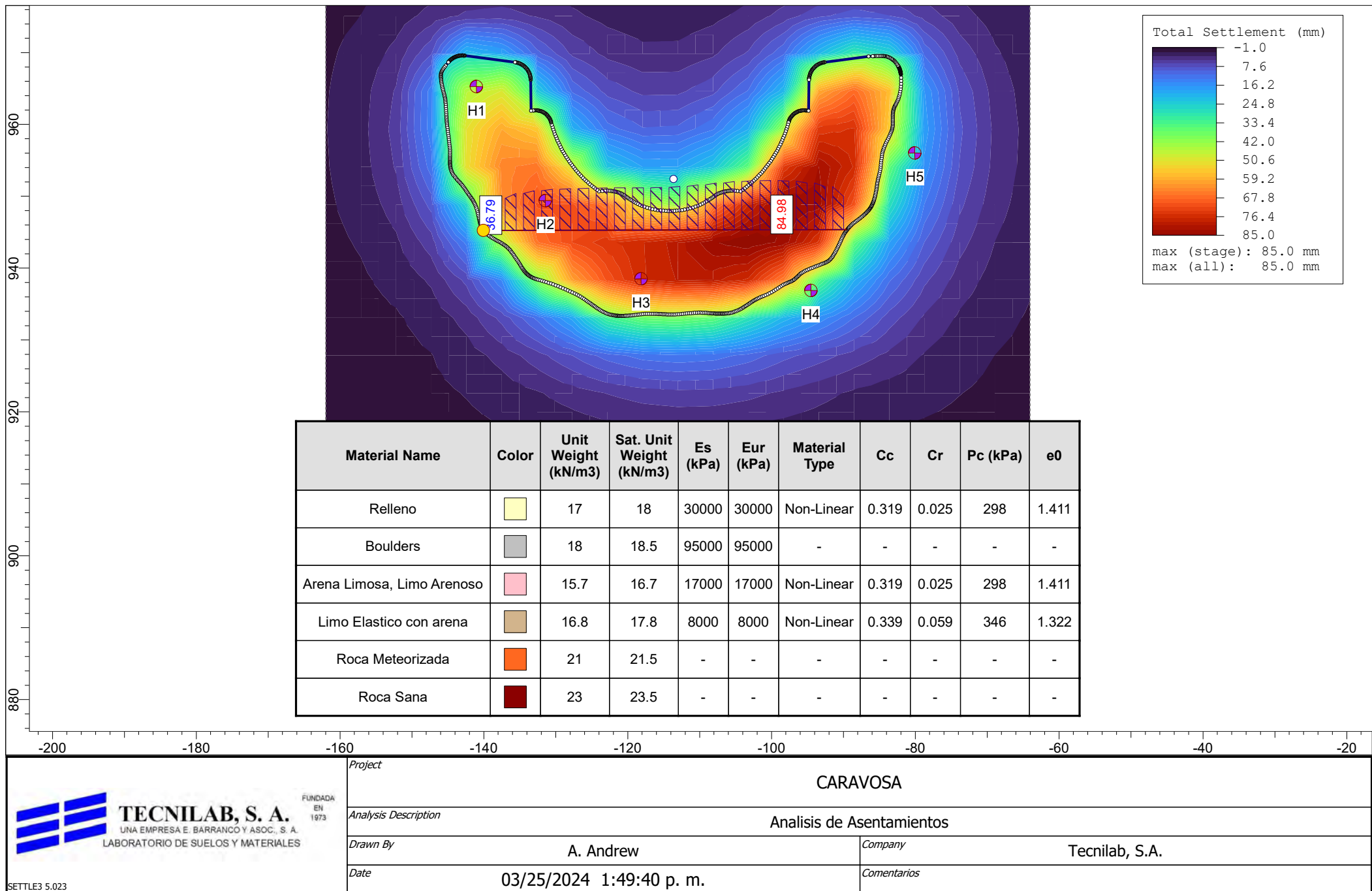
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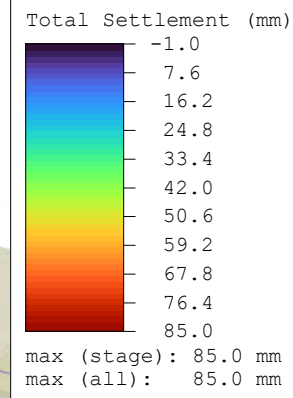
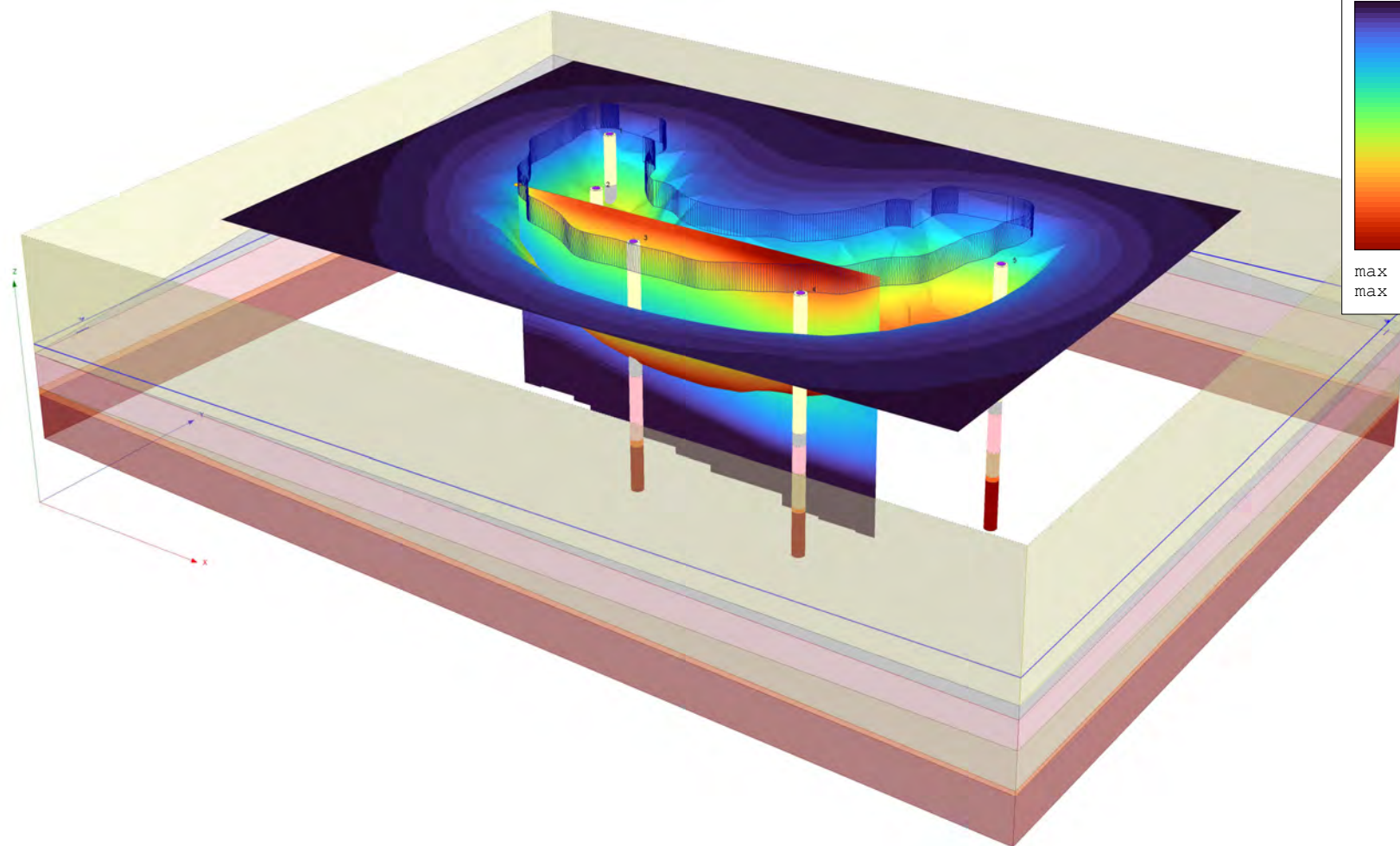
Comentarios



**APENDICE B**  
**ANALISIS DE ASENTAMIENTOS**

**TECNILAB, S. A.**





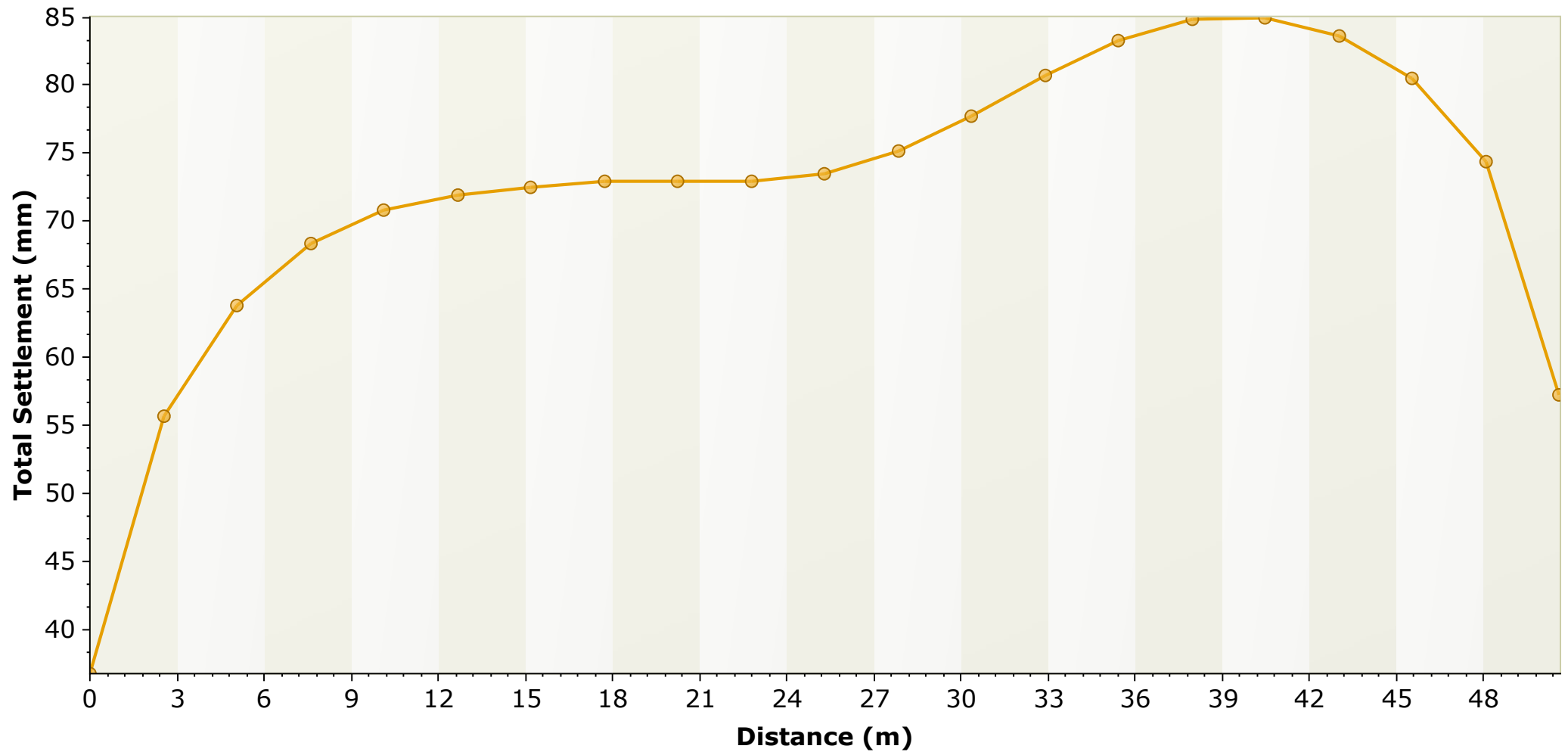
**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

SETTLE3 5.023

|                      |                           |             |                |
|----------------------|---------------------------|-------------|----------------|
| Project              | CARAVOSA                  |             |                |
| Analysis Description | Analisis de Asentamientos |             |                |
| Drawn By             | A. Andrew                 | Company     | Tecnilab, S.A. |
| Date                 | 03/25/2024 1:51:22 p. m.  | Comentarios |                |

## Distance vs. Total Settlement



Reference Stage: None

Total Settlement at Elevation = 0 m



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

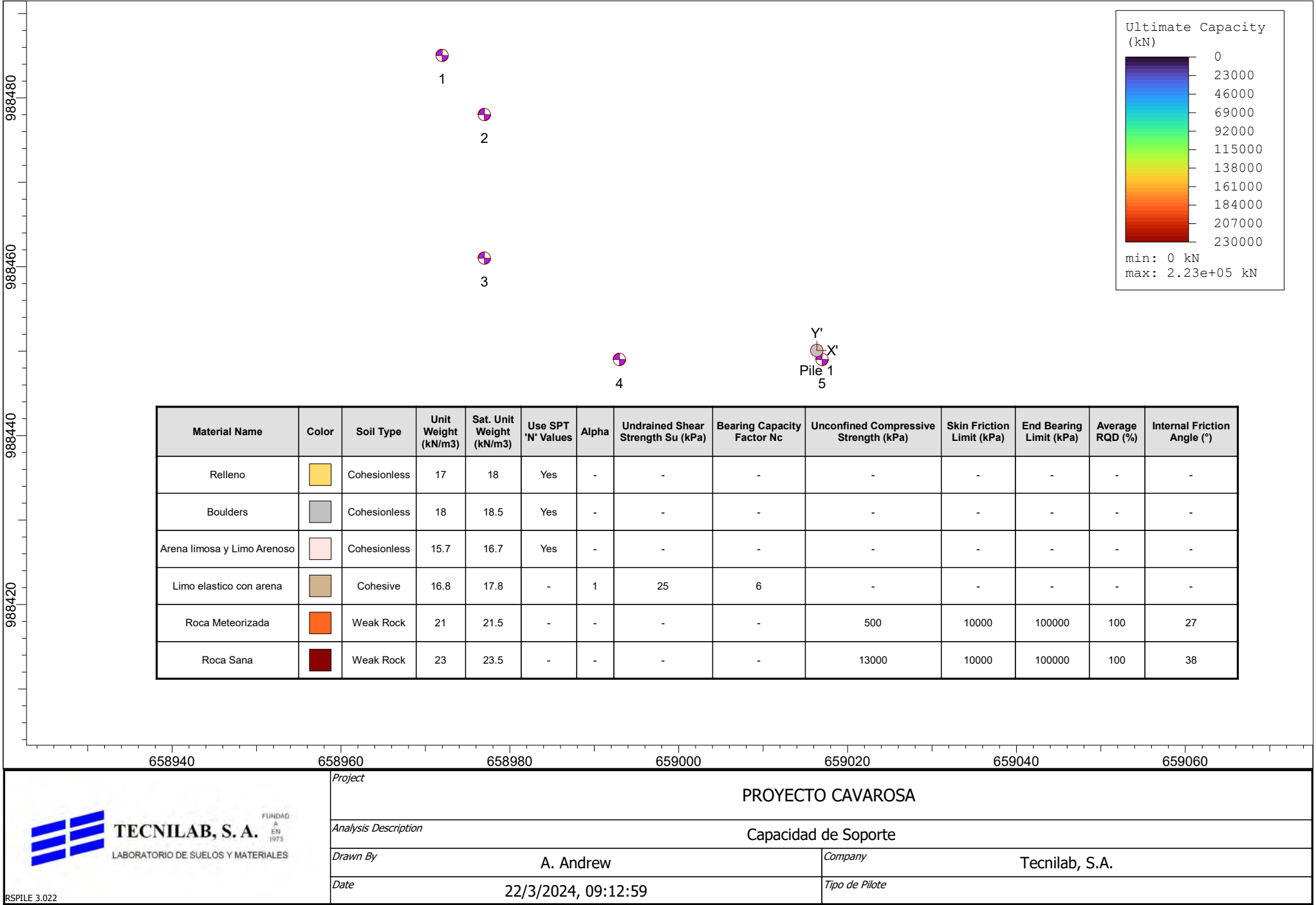
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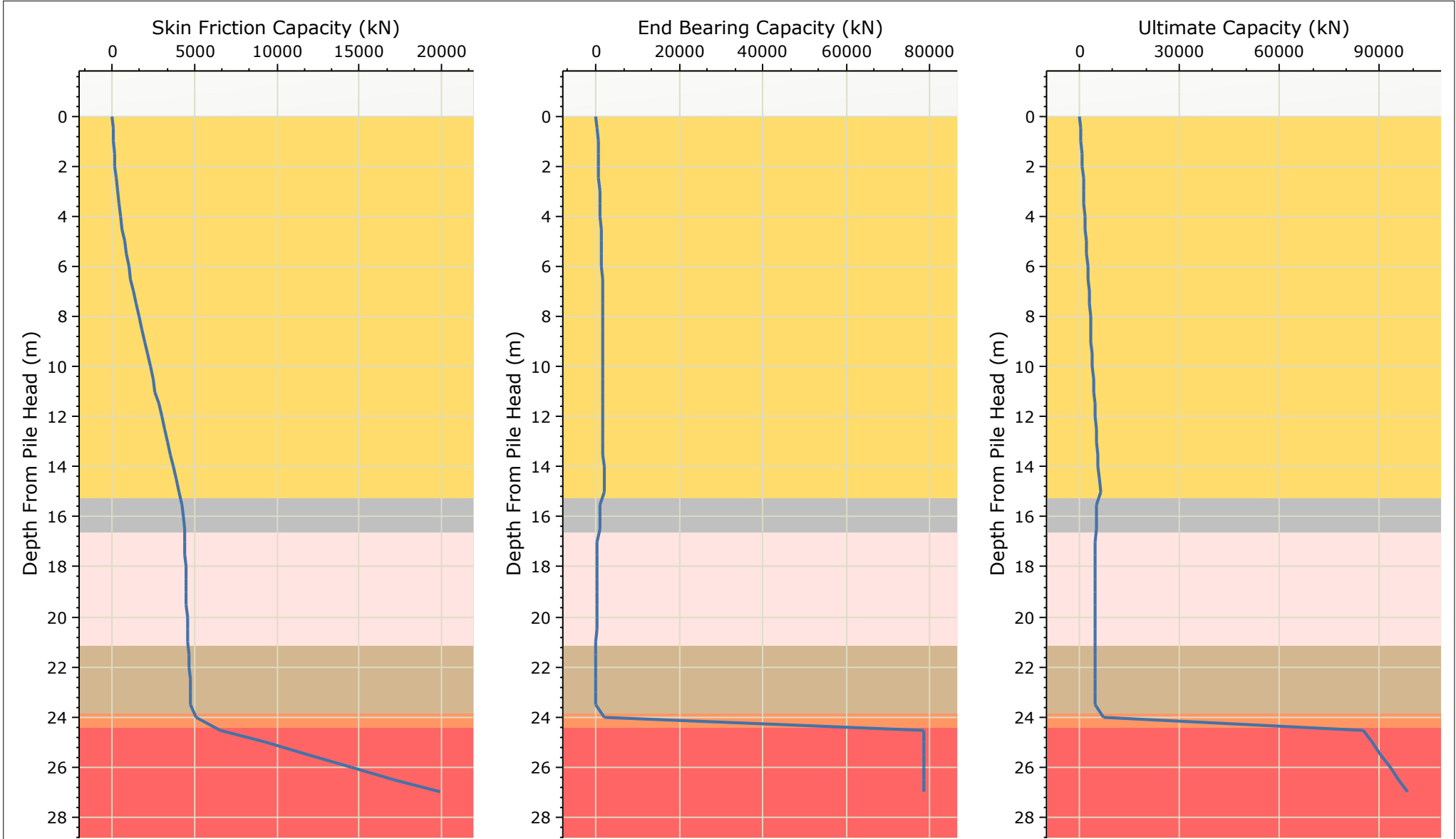
|                      |  |                           |                           |
|----------------------|--|---------------------------|---------------------------|
| Project              |  | CARAVOSA                  |                           |
| Analysis Description |  | Analisis de Asentamientos |                           |
| Drawn By             |  | A. Andrew                 | Company<br>Tecnilab, S.A. |
| Date                 |  | 03/25/2024 1:55:57 p. m.  | Comentarios               |



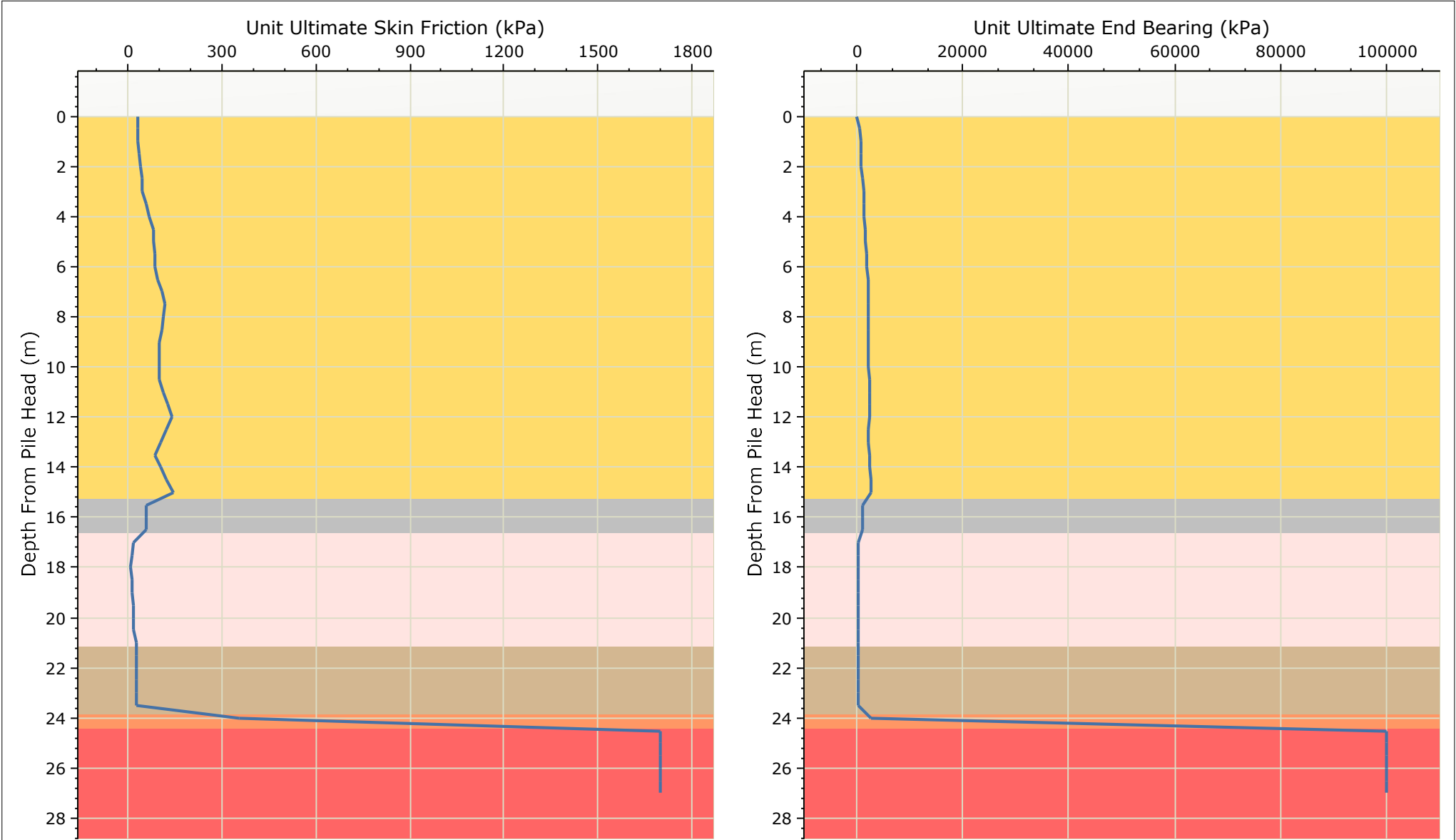
**APENDICE C**  
**ANALISIS DE CAPACIDAD DE SOPORTE**  
**PARA PILOTES**

**TECNILAB, S. A.**





|                                                                                                                                                                                    |                      |  |  |                      |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|--|----------------------|----------------|
|  <b>TECNILAB, S. A.</b><br><small>FUNDADA EN 1973<br/>LABORATORIO DE SUELOS Y MATERIALES</small> | Project              |  |  | PROYECTO CAVAROSA    |                |
|                                                                                                                                                                                    | Analysis Description |  |  | Capacidad de Soporte |                |
|                                                                                                                                                                                    | Drawn By             |  |  | Company              | Tecnilab, S.A. |
|                                                                                                                                                                                    | Date                 |  |  | Tipo de Pilote       | D=1.00m        |
| 22/3/2024, 09:12:59                                                                                                                                                                |                      |  |  |                      |                |



|                                                                                                                                                                                    |                      |  |  |                      |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|--|--|----------------------|----------------|
|  <b>TECNILAB, S. A.</b><br><small>FUNDADA EN 1973<br/>LABORATORIO DE SUELOS Y MATERIALES</small> | Project              |  |  | PROYECTO CAVAROSA    |                |
|                                                                                                                                                                                    | Analysis Description |  |  | Capacidad de Soporte |                |
|                                                                                                                                                                                    | Drawn By             |  |  | Company              | Tecnilab, S.A. |
|                                                                                                                                                                                    | Date                 |  |  | Tipo de Pilote       | D=1.00m        |
| 22/3/2024, 09:12:59                                                                                                                                                                |                      |  |  |                      |                |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

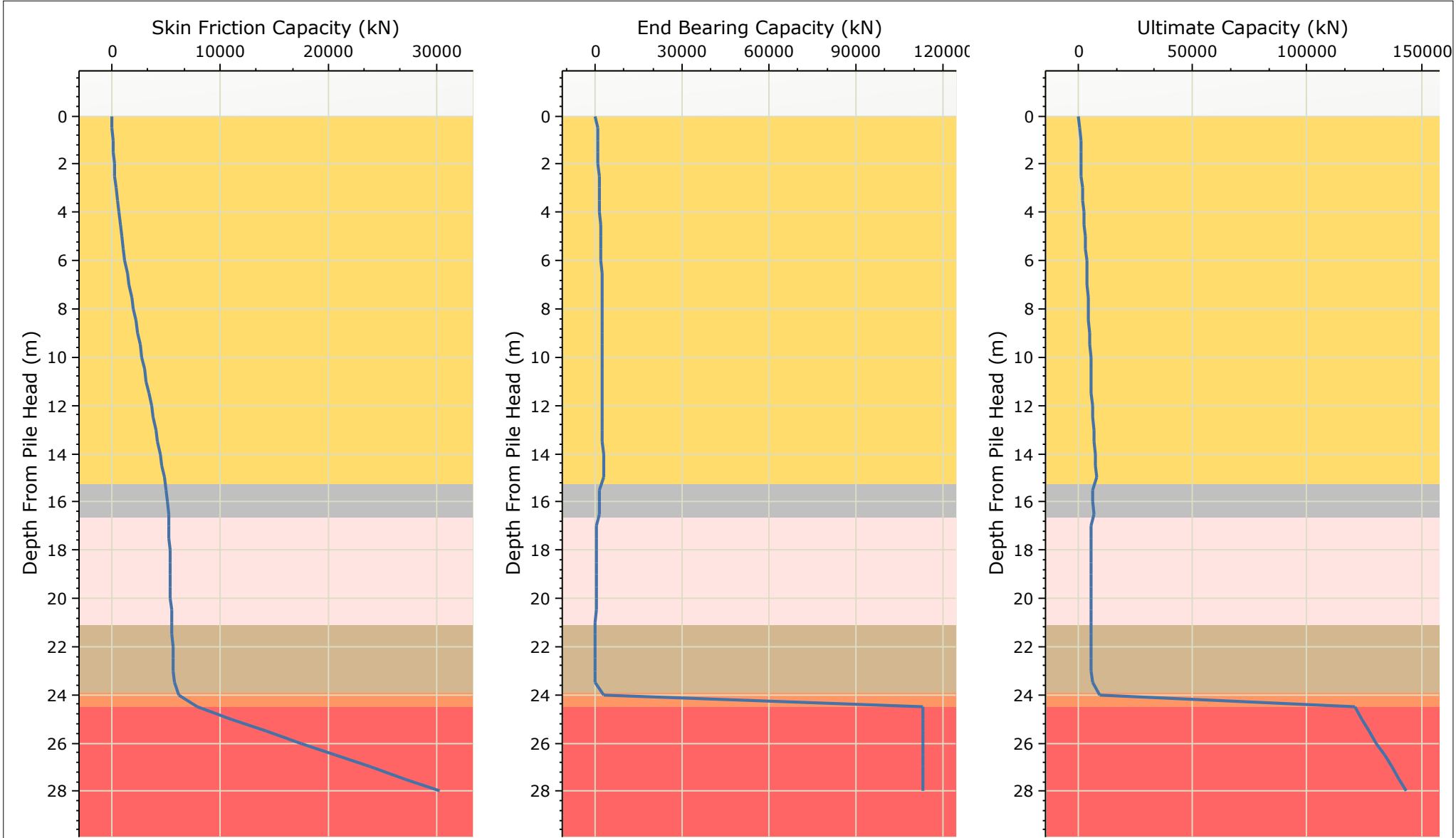
| D=1.00m                  |                             |                           |                        |                                 |                                   |
|--------------------------|-----------------------------|---------------------------|------------------------|---------------------------------|-----------------------------------|
| Depth From Pile Head (m) | Skin Friction Capacity (kN) | End Bearing Capacity (kN) | Ultimate Capacity (kN) | Unit Ultimate End Bearing (kPa) | Unit Ultimate Skin Friction (kPa) |
| 0.00                     | 0.00                        | 0.00                      | 0.00                   | 0.00                            | 28.70                             |
| 0.50                     | 45.08                       | 497.11                    | 542.19                 | 632.94                          | 28.70                             |
| 1.00                     | 91.77                       | 542.30                    | 634.08                 | 690.48                          | 31.57                             |
| 1.50                     | 143.24                      | 632.69                    | 775.92                 | 805.56                          | 34.44                             |
| 2.00                     | 200.61                      | 723.07                    | 923.68                 | 920.64                          | 37.31                             |
| 2.50                     | 263.17                      | 813.45                    | 1076.62                | 1035.72                         | 43.05                             |
| 3.00                     | 332.58                      | 949.03                    | 1281.61                | 1208.34                         | 45.92                             |
| 3.50                     | 413.22                      | 1039.41                   | 1452.63                | 1323.42                         | 57.40                             |
| 4.00                     | 512.73                      | 1129.80                   | 1642.52                | 1438.50                         | 68.88                             |
| 4.50                     | 630.12                      | 1220.18                   | 1850.30                | 1553.58                         | 80.36                             |
| 5.00                     | 756.89                      | 1355.75                   | 2112.64                | 1726.20                         | 80.36                             |
| 5.50                     | 886.42                      | 1446.14                   | 2332.56                | 1841.28                         | 83.23                             |
| 6.00                     | 1015.88                     | 1536.52                   | 2552.40                | 1956.36                         | 83.23                             |
| 6.50                     | 1154.94                     | 1581.71                   | 2736.65                | 2013.90                         | 94.71                             |
| 7.00                     | 1312.63                     | 1672.10                   | 2984.73                | 2128.98                         | 106.19                            |
| 7.50                     | 1488.62                     | 1672.10                   | 3160.72                | 2128.98                         | 117.67                            |
| 8.00                     | 1669.21                     | 1672.10                   | 3341.31                | 2128.98                         | 111.93                            |
| 8.50                     | 1840.78                     | 1626.91                   | 3467.68                | 2071.44                         | 106.19                            |
| 9.00                     | 2002.56                     | 1626.91                   | 3629.46                | 2071.44                         | 100.45                            |
| 9.50                     | 2161.40                     | 1626.91                   | 3788.31                | 2071.44                         | 100.45                            |
| 10.00                    | 2316.54                     | 1717.29                   | 4033.83                | 2186.52                         | 97.58                             |
| 10.50                    | 2469.46                     | 1807.67                   | 4277.13                | 2301.60                         | 97.58                             |
| 11.00                    | 2634.63                     | 1852.86                   | 4487.49                | 2359.14                         | 111.93                            |
| 11.50                    | 2822.70                     | 1807.67                   | 4630.37                | 2301.60                         | 126.28                            |
| 12.00                    | 3031.04                     | 1807.67                   | 4838.71                | 2301.60                         | 140.63                            |
| 12.50                    | 3236.94                     | 1762.48                   | 4999.42                | 2244.06                         | 120.54                            |
| 13.00                    | 3413.89                     | 1762.48                   | 5176.37                | 2244.06                         | 103.32                            |
| 13.50                    | 3558.74                     | 1807.67                   | 5366.41                | 2301.60                         | 83.23                             |
| 14.00                    | 3705.33                     | 1898.06                   | 5603.39                | 2416.68                         | 103.32                            |
| 14.50                    | 3882.02                     | 2033.63                   | 5915.65                | 2589.30                         | 123.41                            |
| 15.00                    | 4092.41                     | 2169.21                   | 6261.61                | 2761.92                         | 143.50                            |
| 15.50                    | 4209.48                     | 903.84                    | 5113.32                | 1150.80                         | 57.40                             |
| 16.00                    | 4299.65                     | 903.84                    | 5203.49                | 1150.80                         | 57.40                             |
| 16.50                    | 4389.21                     | 903.84                    | 5293.04                | 1150.80                         | 57.40                             |
| 17.00                    | 4419.35                     | 225.96                    | 4645.31                | 287.70                          | 17.22                             |
| 17.50                    | 4441.18                     | 225.96                    | 4667.13                | 287.70                          | 11.48                             |
| 18.00                    | 4457.43                     | 225.96                    | 4683.39                | 287.70                          | 8.61                              |
| 18.50                    | 4474.87                     | 225.96                    | 4700.82                | 287.70                          | 11.48                             |
| 19.00                    | 4493.12                     | 225.96                    | 4719.08                | 287.70                          | 14.35                             |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP

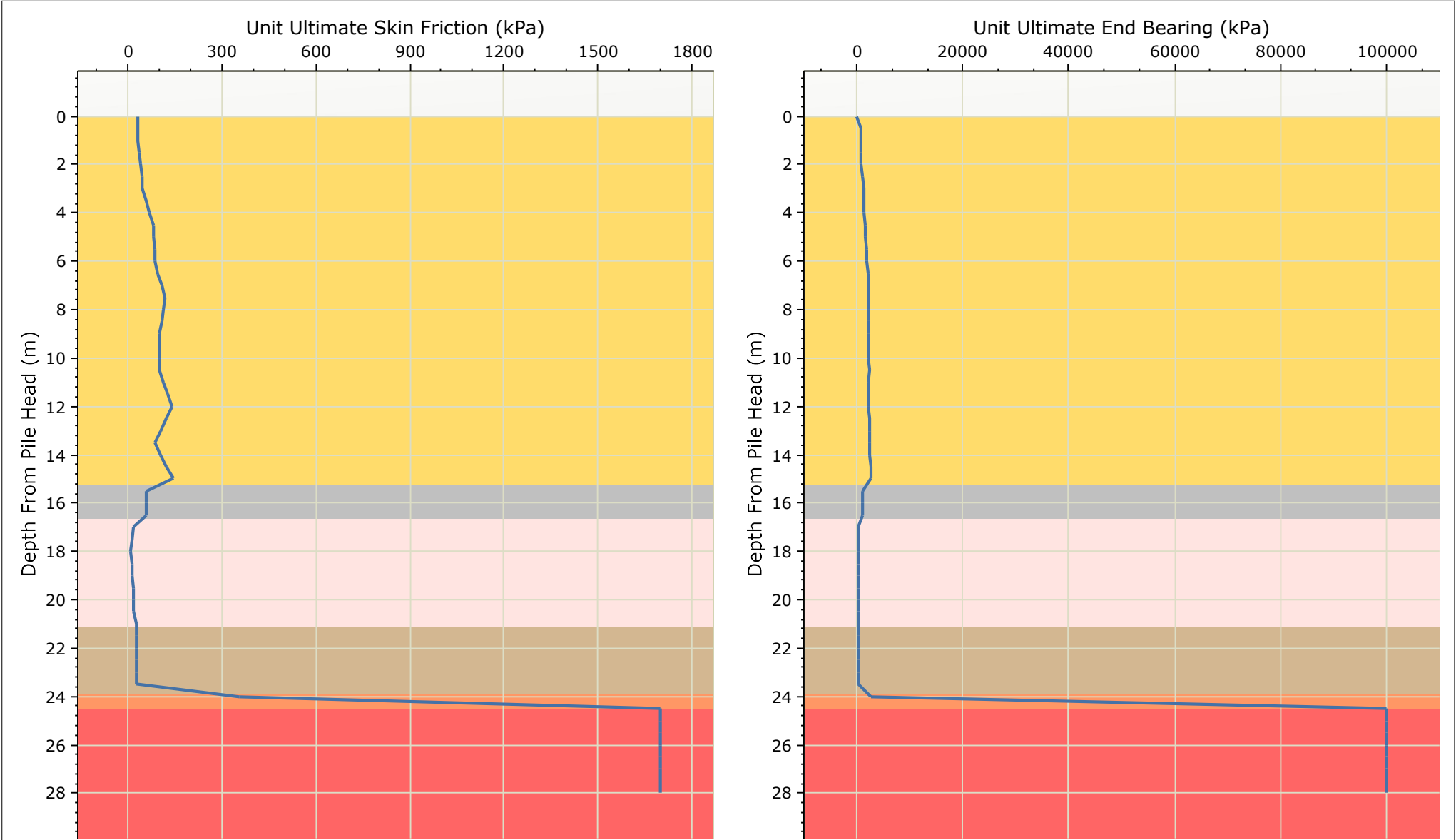


**TECNILAB, S. A.**  
 UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
 LABORATORIO DE SUELOS Y MATERIALES  
 FUNDADA  
 EN  
 1973

| D=1.00m |          |          |          |           |         |
|---------|----------|----------|----------|-----------|---------|
| 19.50   | 4518.60  | 271.15   | 4789.75  | 345.24    | 17.22   |
| 20.00   | 4546.88  | 271.15   | 4818.03  | 345.24    | 17.22   |
| 20.50   | 4572.94  | 271.15   | 4844.09  | 345.24    | 17.22   |
| 21.00   | 4601.38  | 117.81   | 4719.19  | 150.00    | 25.00   |
| 21.50   | 4639.22  | 117.81   | 4757.03  | 150.00    | 25.00   |
| 22.00   | 4679.09  | 117.81   | 4796.90  | 150.00    | 25.00   |
| 22.50   | 4718.36  | 117.81   | 4836.17  | 150.00    | 25.00   |
| 23.00   | 4758.24  | 117.81   | 4876.05  | 150.00    | 25.00   |
| 23.50   | 4798.39  | 117.81   | 4916.20  | 150.00    | 25.00   |
| 24.00   | 5111.85  | 2091.47  | 7203.32  | 2662.94   | 353.55  |
| 24.50   | 6551.27  | 78539.82 | 85091.09 | 100000.00 | 1700.00 |
| 25.00   | 9220.42  | 78539.82 | 87760.23 | 100000.00 | 1700.00 |
| 25.50   | 11891.37 | 78539.82 | 90431.19 | 100000.00 | 1700.00 |
| 26.00   | 14563.21 | 78539.82 | 93103.02 | 100000.00 | 1700.00 |
| 26.50   | 17233.58 | 78539.82 | 95773.40 | 100000.00 | 1700.00 |
| 27.00   | 19902.44 | 78539.82 | 98442.26 | 100000.00 | 1700.00 |



|                                                                                    |                      |  |                     |                      |                |
|------------------------------------------------------------------------------------|----------------------|--|---------------------|----------------------|----------------|
|  | Project              |  |                     | PROYECTO CAVAROSA    |                |
|                                                                                    | Analysis Description |  |                     | Capacidad de Soporte |                |
|                                                                                    | Drawn By             |  |                     | Company              | Tecnilab, S.A. |
|                                                                                    | Date                 |  |                     | Tipo de Pilote       | D=1.20m        |
| RSPILE 3.022                                                                       |                      |  | 22/3/2024, 09:12:59 |                      |                |



|                                                                                    |                      |  |  |                      |                |
|------------------------------------------------------------------------------------|----------------------|--|--|----------------------|----------------|
|  | Project              |  |  | PROYECTO CAVAROSA    |                |
|                                                                                    | Analysis Description |  |  | Capacidad de Soporte |                |
|                                                                                    | Drawn By             |  |  | Company              | Tecnilab, S.A. |
|                                                                                    | Date                 |  |  | Tipo de Pilote       | D=1.20m        |
| 22/3/2024, 09:12:59                                                                |                      |  |  |                      |                |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                             |                           |                        |                                 |                                   |
|--------------------------|-----------------------------|---------------------------|------------------------|---------------------------------|-----------------------------------|
| Depth From Pile Head (m) | Skin Friction Capacity (kN) | End Bearing Capacity (kN) | Ultimate Capacity (kN) | Unit Ultimate End Bearing (kPa) | Unit Ultimate Skin Friction (kPa) |
| 0.00                     | 0.00                        | 0.00                      | 0.00                   | 0.00                            | 28.70                             |
| 0.50                     | 54.10                       | 780.91                    | 835.01                 | 690.48                          | 28.70                             |
| 1.00                     | 110.13                      | 845.99                    | 956.12                 | 748.02                          | 31.57                             |
| 1.50                     | 171.22                      | 911.07                    | 1082.29                | 805.56                          | 34.44                             |
| 2.00                     | 240.74                      | 1041.22                   | 1281.96                | 920.64                          | 37.31                             |
| 2.50                     | 315.44                      | 1236.45                   | 1551.89                | 1093.26                         | 43.05                             |
| 3.00                     | 399.75                      | 1366.60                   | 1766.35                | 1208.34                         | 45.92                             |
| 3.50                     | 495.86                      | 1496.75                   | 1992.62                | 1323.42                         | 57.40                             |
| 4.00                     | 616.14                      | 1626.91                   | 2243.04                | 1438.50                         | 68.88                             |
| 4.50                     | 756.70                      | 1822.13                   | 2578.83                | 1611.12                         | 80.36                             |
| 5.00                     | 908.46                      | 1952.29                   | 2860.75                | 1726.20                         | 80.36                             |
| 5.50                     | 1061.57                     | 2082.44                   | 3144.01                | 1841.28                         | 83.23                             |
| 6.00                     | 1219.53                     | 2212.59                   | 3432.12                | 1956.36                         | 83.23                             |
| 6.50                     | 1386.12                     | 2277.67                   | 3663.79                | 2013.90                         | 94.71                             |
| 7.00                     | 1575.50                     | 2342.74                   | 3918.25                | 2071.44                         | 106.19                            |
| 7.50                     | 1785.65                     | 2407.82                   | 4193.47                | 2128.98                         | 117.67                            |
| 8.00                     | 2002.42                     | 2407.82                   | 4410.24                | 2128.98                         | 111.93                            |
| 8.50                     | 2206.87                     | 2342.74                   | 4549.61                | 2071.44                         | 106.19                            |
| 9.00                     | 2404.88                     | 2342.74                   | 4747.62                | 2071.44                         | 100.45                            |
| 9.50                     | 2593.06                     | 2407.82                   | 5000.88                | 2128.98                         | 100.45                            |
| 10.00                    | 2779.47                     | 2537.97                   | 5317.44                | 2244.06                         | 97.58                             |
| 10.50                    | 2963.55                     | 2603.05                   | 5566.60                | 2301.60                         | 97.58                             |
| 11.00                    | 3161.56                     | 2537.97                   | 5699.53                | 2244.06                         | 111.93                            |
| 11.50                    | 3383.10                     | 2537.97                   | 5921.07                | 2244.06                         | 126.28                            |
| 12.00                    | 3637.93                     | 2537.97                   | 6175.90                | 2244.06                         | 140.63                            |
| 12.50                    | 3883.01                     | 2603.05                   | 6486.06                | 2301.60                         | 120.54                            |
| 13.00                    | 4094.85                     | 2668.12                   | 6762.98                | 2359.14                         | 103.32                            |
| 13.50                    | 4270.27                     | 2668.12                   | 6938.40                | 2359.14                         | 83.23                             |
| 14.00                    | 4446.07                     | 2733.20                   | 7179.27                | 2416.68                         | 103.32                            |
| 14.50                    | 4656.61                     | 2928.43                   | 7585.04                | 2589.30                         | 123.41                            |
| 15.00                    | 4913.94                     | 3058.58                   | 7972.52                | 2704.38                         | 143.50                            |
| 15.50                    | 5049.04                     | 1301.52                   | 6350.56                | 1150.80                         | 57.40                             |
| 16.00                    | 5156.47                     | 1301.52                   | 6457.99                | 1150.80                         | 57.40                             |
| 16.50                    | 5265.43                     | 1301.52                   | 6566.96                | 1150.80                         | 57.40                             |
| 17.00                    | 5303.60                     | 325.38                    | 5628.98                | 287.70                          | 17.22                             |
| 17.50                    | 5324.13                     | 325.38                    | 5649.51                | 287.70                          | 11.48                             |
| 18.00                    | 5350.76                     | 325.38                    | 5676.14                | 287.70                          | 8.61                              |
| 18.50                    | 5364.94                     | 325.38                    | 5690.32                | 287.70                          | 11.48                             |
| 19.00                    | 5393.80                     | 325.38                    | 5719.18                | 287.70                          | 14.35                             |

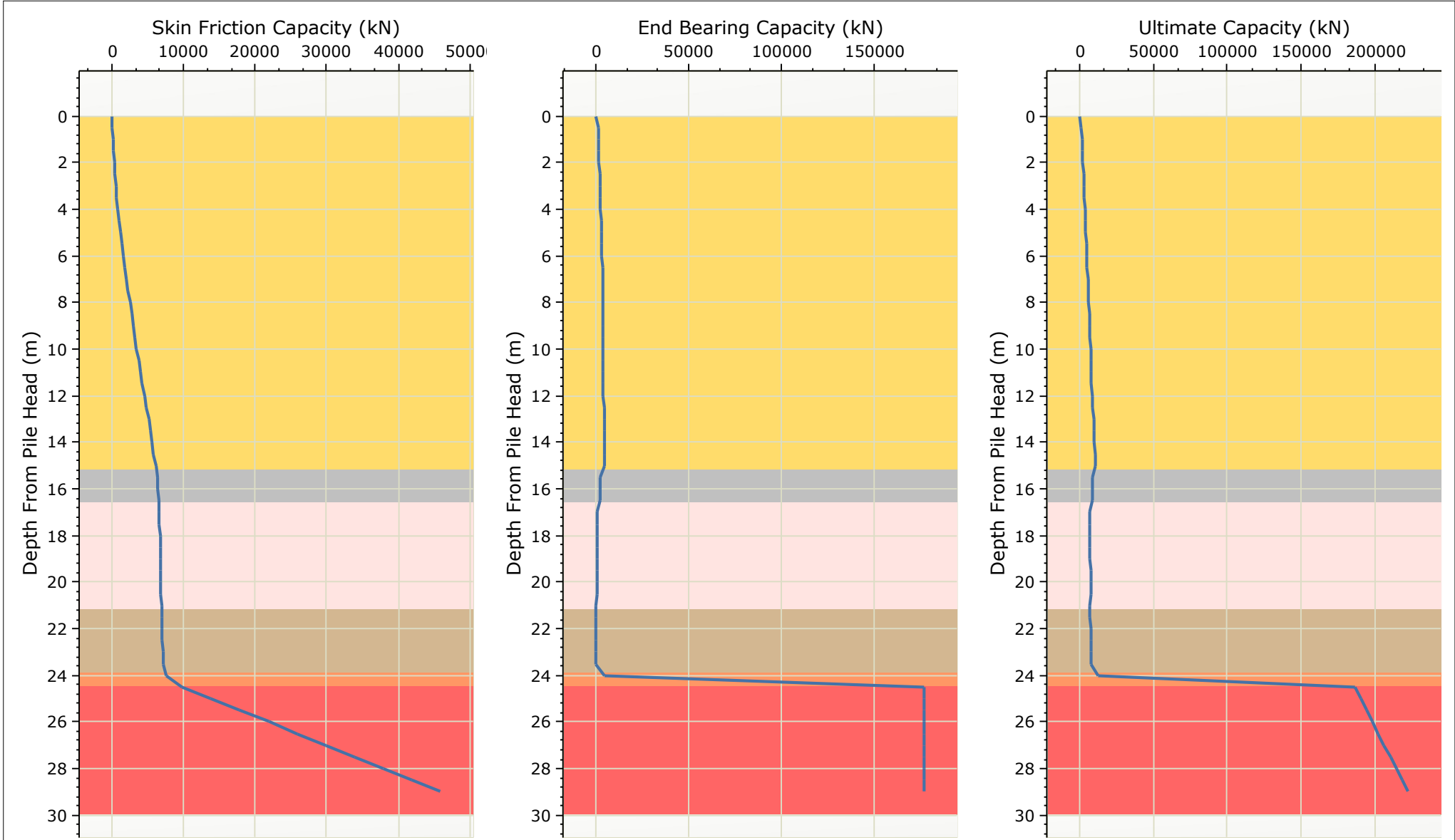
Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



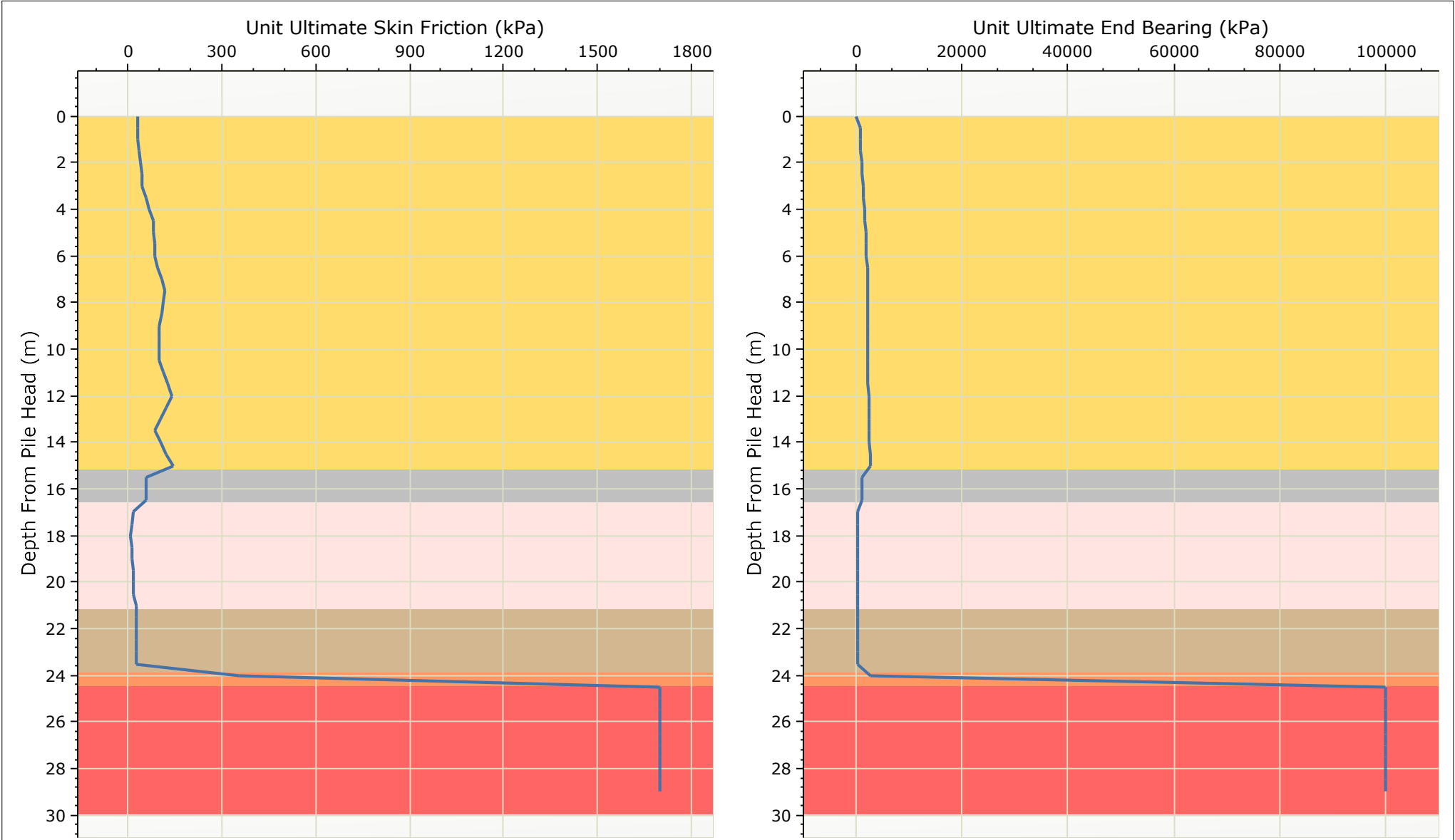
**TECNILAB, S. A.**  
 UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
 LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
 EN  
 1973

| D=1.20m |          |           |           |           |         |
|---------|----------|-----------|-----------|-----------|---------|
| 19.50   | 5423.26  | 390.46    | 5813.71   | 345.24    | 17.22   |
| 20.00   | 5452.13  | 390.46    | 5842.58   | 345.24    | 17.22   |
| 20.50   | 5483.95  | 390.46    | 5874.41   | 345.24    | 17.22   |
| 21.00   | 5515.26  | 169.65    | 5684.91   | 150.00    | 25.00   |
| 21.50   | 5569.50  | 169.65    | 5739.14   | 150.00    | 25.00   |
| 22.00   | 5615.89  | 169.65    | 5785.54   | 150.00    | 25.00   |
| 22.50   | 5663.75  | 169.65    | 5833.39   | 150.00    | 25.00   |
| 23.00   | 5710.14  | 169.65    | 5879.79   | 150.00    | 25.00   |
| 23.50   | 5757.99  | 169.65    | 5927.64   | 150.00    | 25.00   |
| 24.00   | 6135.29  | 3011.71   | 9147.00   | 2662.94   | 353.55  |
| 24.50   | 7862.30  | 113097.34 | 120959.63 | 100000.00 | 1700.00 |
| 25.00   | 11067.09 | 113097.34 | 124164.42 | 100000.00 | 1700.00 |
| 25.50   | 14271.50 | 113097.34 | 127368.84 | 100000.00 | 1700.00 |
| 26.00   | 17475.56 | 113097.34 | 130572.89 | 100000.00 | 1700.00 |
| 26.50   | 20679.64 | 113097.34 | 133776.97 | 100000.00 | 1700.00 |
| 27.00   | 23884.78 | 113097.34 | 136982.12 | 100000.00 | 1700.00 |
| 27.50   | 27088.46 | 113097.34 | 140185.80 | 100000.00 | 1700.00 |
| 28.00   | 30292.91 | 113097.34 | 143390.24 | 100000.00 | 1700.00 |



|                                                                                    |                      |  |                     |                      |                |
|------------------------------------------------------------------------------------|----------------------|--|---------------------|----------------------|----------------|
|  | Project              |  |                     | PROYECTO CAVAROSA    |                |
|                                                                                    | Analysis Description |  |                     | Capacidad de Soporte |                |
|                                                                                    | Drawn By             |  |                     | Company              | Tecnilab, S.A. |
|                                                                                    | Date                 |  |                     | Tipo de Pilote       | D=1.50m        |
| RSPILE 3.022                                                                       |                      |  | 22/3/2024, 09:12:59 |                      |                |



**TECNILAB, S. A.**

LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Capacidad de Soporte

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.50m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 0.00                     | -4.17               | 58876.28              | 57.11              |
| 0.28                     | -4.12               | 58790.46              | 171.32             |
| 0.56                     | -4.07               | 58676.05              | 285.53             |
| 0.85                     | -4.02               | 58561.64              | 399.74             |
| 1.13                     | -3.97               | 58447.25              | 513.95             |
| 1.41                     | -3.92               | 58332.86              | 628.16             |
| 1.69                     | -3.87               | 58218.48              | 742.37             |
| 1.97                     | -3.82               | 58104.10              | 856.58             |
| 2.25                     | -3.77               | 57989.73              | 970.79             |
| 2.54                     | -3.72               | 57875.37              | 1085.01            |
| 2.82                     | -3.67               | 57761.01              | 1199.22            |
| 3.10                     | -3.62               | 57646.65              | 1313.43            |
| 3.38                     | -3.57               | 57532.30              | 1427.64            |
| 3.66                     | -3.53               | 57417.95              | 1541.85            |
| 3.95                     | -3.48               | 57303.61              | 1656.06            |
| 4.23                     | -3.43               | 57189.27              | 1770.27            |
| 4.51                     | -3.38               | 57074.93              | 1884.48            |
| 4.79                     | -3.34               | 56960.59              | 1998.69            |
| 5.07                     | -3.29               | 56846.26              | 2112.91            |
| 5.35                     | -3.24               | 56731.93              | 2227.12            |
| 5.64                     | -3.20               | 56617.61              | 2341.33            |
| 5.92                     | -3.15               | 56503.28              | 2455.54            |
| 6.20                     | -3.11               | 56388.96              | 2569.75            |
| 6.48                     | -3.06               | 56274.64              | 2683.96            |
| 6.76                     | -3.01               | 56160.33              | 2798.17            |
| 7.05                     | -2.97               | 56046.01              | 2912.38            |
| 7.33                     | -2.92               | 55931.70              | 3026.59            |
| 7.61                     | -2.88               | 55817.39              | 3140.81            |
| 7.89                     | -2.83               | 55703.08              | 3255.02            |
| 8.17                     | -2.79               | 55588.78              | 3369.23            |
| 8.45                     | -2.75               | 55474.48              | 3483.44            |
| 8.74                     | -2.70               | 55360.17              | 3597.65            |
| 9.02                     | -2.66               | 55245.87              | 3711.86            |
| 9.30                     | -2.61               | 55131.58              | 3826.07            |
| 9.58                     | -2.57               | 55017.28              | 3940.28            |
| 9.86                     | -2.53               | 54902.99              | 4054.49            |
| 10.15                    | -2.48               | 54788.70              | 4168.71            |
| 10.43                    | -2.44               | 54674.41              | 4282.92            |
| 10.71                    | -2.40               | 54560.12              | 4397.13            |
| 10.99                    | -2.35               | 54445.83              | 4511.34            |
| 11.27                    | -2.31               | 54331.55              | 4625.55            |
| 11.55                    | -2.27               | 54217.26              | 4739.76            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 11.84                    | -2.23               | 54102.98              | 4853.97            |
| 12.12                    | -2.19               | 53988.70              | 4968.18            |
| 12.40                    | -2.14               | 53875.02              | 5052.64            |
| 12.67                    | -2.10               | 53764.94              | 5189.42            |
| 12.94                    | -2.06               | 53655.46              | 5298.84            |
| 13.21                    | -2.02               | 53545.98              | 5408.26            |
| 13.48                    | -1.98               | 53436.50              | 5517.69            |
| 13.75                    | -1.95               | 53327.02              | 5627.11            |
| 14.02                    | -1.91               | 53217.54              | 5736.53            |
| 14.29                    | -1.87               | 53108.07              | 5845.95            |
| 14.56                    | -1.83               | 52998.59              | 5955.37            |
| 14.83                    | -1.79               | 52889.12              | 6064.79            |
| 15.10                    | -1.75               | 52781.58              | 6143.01            |
| 15.45                    | -1.70               | 52685.60              | 6260.52            |
| 15.80                    | -1.65               | 52591.55              | 6354.53            |
| 16.15                    | -1.60               | 52497.50              | 6448.55            |
| 16.50                    | -1.55               | 52412.58              | 6500.80            |
| 16.82                    | -1.51               | 52382.45              | 6527.04            |
| 17.14                    | -1.46               | 52361.45              | 6548.03            |
| 17.45                    | -1.42               | 52340.45              | 6569.02            |
| 17.77                    | -1.37               | 52319.45              | 6590.02            |
| 18.09                    | -1.33               | 52298.45              | 6611.01            |
| 18.41                    | -1.28               | 52277.45              | 6632.00            |
| 18.73                    | -1.24               | 52256.46              | 6652.99            |
| 19.05                    | -1.20               | 52235.46              | 6673.99            |
| 19.36                    | -1.15               | 52214.46              | 6694.98            |
| 19.68                    | -1.11               | 52193.46              | 6715.97            |
| 20.00                    | -1.06               | 52172.47              | 6736.96            |
| 20.32                    | -1.02               | 52151.47              | 6757.95            |
| 20.64                    | -0.97               | 52130.48              | 6778.95            |
| 20.95                    | -0.93               | 52106.99              | 6799.67            |
| 21.30                    | -0.88               | 52068.56              | 6850.81            |
| 21.65                    | -0.83               | 52027.65              | 6891.72            |
| 22.00                    | -0.78               | 51986.73              | 6932.63            |
| 22.34                    | -0.74               | 51945.82              | 6973.54            |
| 22.69                    | -0.69               | 51904.90              | 7014.45            |
| 23.04                    | -0.64               | 51863.99              | 7055.36            |
| 23.39                    | -0.59               | 51823.08              | 7096.27            |
| 23.73                    | -0.54               | 51758.51              | 7174.27            |
| 23.87                    | -0.53               | 51552.00              | 7461.96            |
| 24.01                    | -0.51               | 51321.83              | 7692.12            |
| 24.15                    | -0.49               | 51091.67              | 7922.28            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



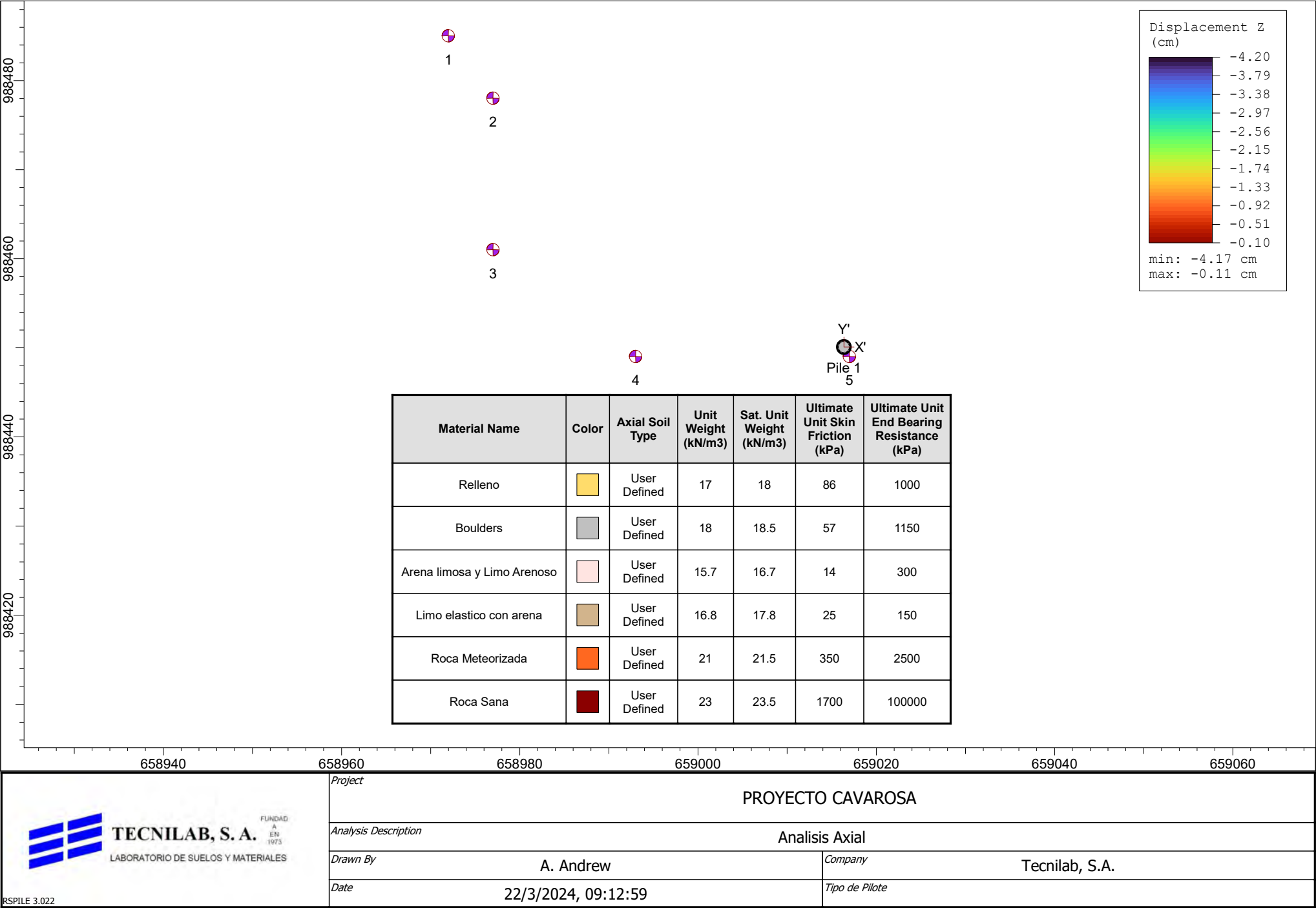
**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 24.29                    | -0.47               | 50595.54              | 8626.81            |
| 24.59                    | -0.43               | 48503.62              | 11574.04           |
| 24.88                    | -0.40               | 46145.71              | 13931.83           |
| 25.17                    | -0.36               | 43787.78              | 16289.63           |
| 25.47                    | -0.33               | 41429.86              | 18647.42           |
| 25.76                    | -0.31               | 39071.94              | 21005.21           |
| 26.06                    | -0.28               | 36714.03              | 23363.00           |
| 26.35                    | -0.26               | 34356.13              | 25720.79           |
| 26.65                    | -0.23               | 32029.48              | 27933.47           |
| 26.94                    | -0.21               | 29951.31              | 29960.15           |
| 27.23                    | -0.20               | 27970.48              | 31811.79           |
| 27.53                    | -0.18               | 26240.01              | 33504.64           |
| 27.82                    | -0.16               | 24586.35              | 35047.36           |
| 28.12                    | -0.15               | 23148.22              | 36452.82           |
| 28.41                    | -0.14               | 21776.65              | 37727.94           |
| 28.71                    | -0.12               | 20592.89              | 38882.99           |
| 29.00                    | -0.11               | 19726.63              | 39403.21           |



**APENDICE D**  
**ANALISIS AXIAL DE PILOTES**



TECNILAB, S. A.

FUNDADA EN 1973

LABORATORIO DE SUELOS Y MATERIALES

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Axial

Drawn By

A. Andrew

Company

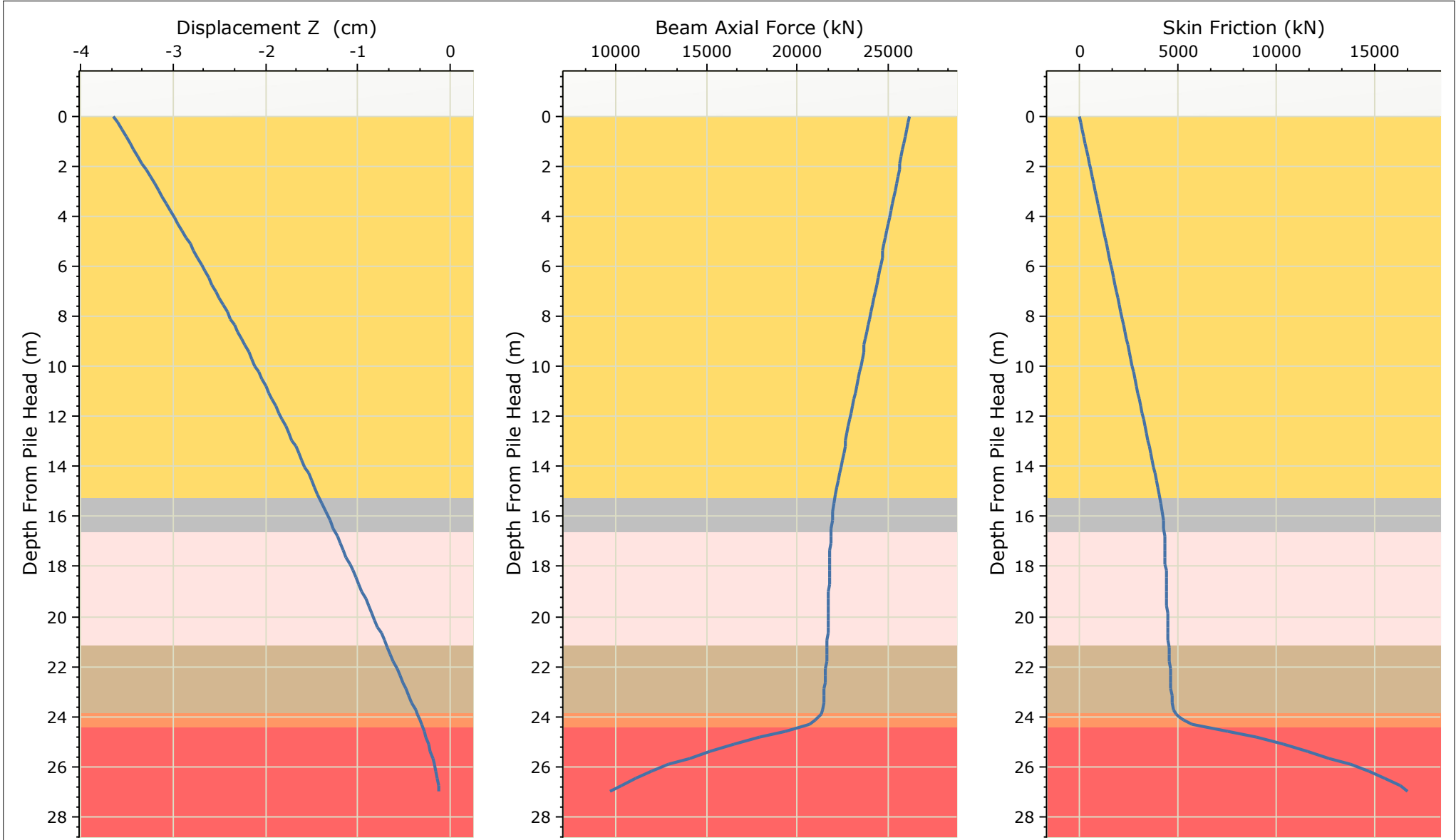
Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

RSPILE 3.022



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Axial

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.00m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 0.00                     | -3.65               | 26161.76              | 36.42              |
| 0.27                     | -3.61               | 26107.06              | 109.25             |
| 0.54                     | -3.56               | 26034.12              | 182.08             |
| 0.81                     | -3.51               | 25961.19              | 254.91             |
| 1.08                     | -3.47               | 25888.26              | 327.74             |
| 1.35                     | -3.42               | 25815.33              | 400.57             |
| 1.62                     | -3.38               | 25742.41              | 473.40             |
| 1.89                     | -3.33               | 25669.49              | 546.23             |
| 2.16                     | -3.29               | 25596.57              | 619.06             |
| 2.43                     | -3.25               | 25523.65              | 691.89             |
| 2.70                     | -3.20               | 25450.74              | 764.72             |
| 2.97                     | -3.16               | 25377.82              | 837.55             |
| 3.23                     | -3.12               | 25304.91              | 910.38             |
| 3.50                     | -3.07               | 25232.00              | 983.21             |
| 3.77                     | -3.03               | 25159.09              | 1056.04            |
| 4.04                     | -2.99               | 25086.19              | 1128.87            |
| 4.31                     | -2.94               | 25013.28              | 1201.70            |
| 4.58                     | -2.90               | 24940.38              | 1274.53            |
| 4.85                     | -2.86               | 24867.48              | 1347.36            |
| 5.12                     | -2.82               | 24794.58              | 1420.19            |
| 5.39                     | -2.78               | 24721.68              | 1493.02            |
| 5.66                     | -2.74               | 24648.78              | 1565.85            |
| 5.93                     | -2.70               | 24575.88              | 1638.68            |
| 6.20                     | -2.66               | 24502.99              | 1711.51            |
| 6.47                     | -2.62               | 24430.09              | 1784.34            |
| 6.74                     | -2.58               | 24357.20              | 1857.17            |
| 7.01                     | -2.54               | 24284.31              | 1930.00            |
| 7.28                     | -2.50               | 24211.42              | 2002.83            |
| 7.55                     | -2.46               | 24138.52              | 2075.66            |
| 7.82                     | -2.42               | 24065.64              | 2148.49            |
| 8.09                     | -2.38               | 23992.75              | 2221.32            |
| 8.36                     | -2.34               | 23919.86              | 2294.15            |
| 8.63                     | -2.30               | 23846.98              | 2366.98            |
| 8.90                     | -2.26               | 23774.09              | 2439.81            |
| 9.17                     | -2.23               | 23701.21              | 2512.64            |
| 9.43                     | -2.19               | 23628.33              | 2585.47            |
| 9.70                     | -2.15               | 23555.44              | 2658.30            |
| 9.97                     | -2.11               | 23482.56              | 2731.13            |
| 10.24                    | -2.07               | 23409.68              | 2803.96            |
| 10.51                    | -2.04               | 23336.81              | 2876.80            |
| 10.78                    | -2.00               | 23263.93              | 2949.63            |
| 11.05                    | -1.96               | 23191.05              | 3022.46            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 11.32                    | -1.93               | 23118.18              | 3095.29            |
| 11.59                    | -1.89               | 23045.30              | 3168.12            |
| 11.86                    | -1.85               | 22972.43              | 3240.95            |
| 12.13                    | -1.82               | 22899.56              | 3313.78            |
| 12.40                    | -1.78               | 22826.67              | 3368.43            |
| 12.67                    | -1.75               | 22753.70              | 3459.61            |
| 12.94                    | -1.71               | 22680.71              | 3532.56            |
| 13.21                    | -1.68               | 22607.72              | 3605.51            |
| 13.48                    | -1.64               | 22534.74              | 3678.46            |
| 13.75                    | -1.61               | 22461.75              | 3751.40            |
| 14.02                    | -1.57               | 22388.77              | 3824.35            |
| 14.29                    | -1.54               | 22315.79              | 3897.30            |
| 14.56                    | -1.50               | 22242.81              | 3970.25            |
| 14.83                    | -1.47               | 22169.83              | 4043.20            |
| 15.10                    | -1.44               | 22098.13              | 4095.34            |
| 15.45                    | -1.39               | 22034.15              | 4173.68            |
| 15.80                    | -1.35               | 21971.45              | 4236.36            |
| 16.15                    | -1.30               | 21908.75              | 4299.03            |
| 16.50                    | -1.26               | 21852.35              | 4333.43            |
| 16.78                    | -1.23               | 21833.80              | 4348.74            |
| 17.06                    | -1.19               | 21821.54              | 4360.99            |
| 17.34                    | -1.16               | 21809.29              | 4373.24            |
| 17.61                    | -1.12               | 21797.04              | 4385.49            |
| 17.89                    | -1.09               | 21784.79              | 4397.74            |
| 18.17                    | -1.06               | 21772.53              | 4409.98            |
| 18.45                    | -1.02               | 21760.28              | 4422.23            |
| 18.73                    | -0.99               | 21748.03              | 4434.48            |
| 19.01                    | -0.95               | 21735.78              | 4446.73            |
| 19.28                    | -0.92               | 21723.53              | 4458.98            |
| 19.56                    | -0.89               | 21711.28              | 4471.23            |
| 19.84                    | -0.85               | 21699.03              | 4483.47            |
| 20.12                    | -0.82               | 21686.78              | 4495.72            |
| 20.40                    | -0.78               | 21674.53              | 4507.97            |
| 20.68                    | -0.75               | 21662.28              | 4520.22            |
| 20.96                    | -0.72               | 21648.83              | 4531.80            |
| 21.23                    | -0.68               | 21628.21              | 4559.06            |
| 21.51                    | -0.65               | 21606.39              | 4580.87            |
| 21.79                    | -0.62               | 21584.58              | 4602.68            |
| 22.07                    | -0.58               | 21562.77              | 4624.50            |
| 22.34                    | -0.55               | 21540.95              | 4646.31            |
| 22.62                    | -0.51               | 21519.14              | 4668.12            |
| 22.90                    | -0.48               | 21497.32              | 4689.93            |

Trabajo: 2-1259

Proyecto: CAVAROSA

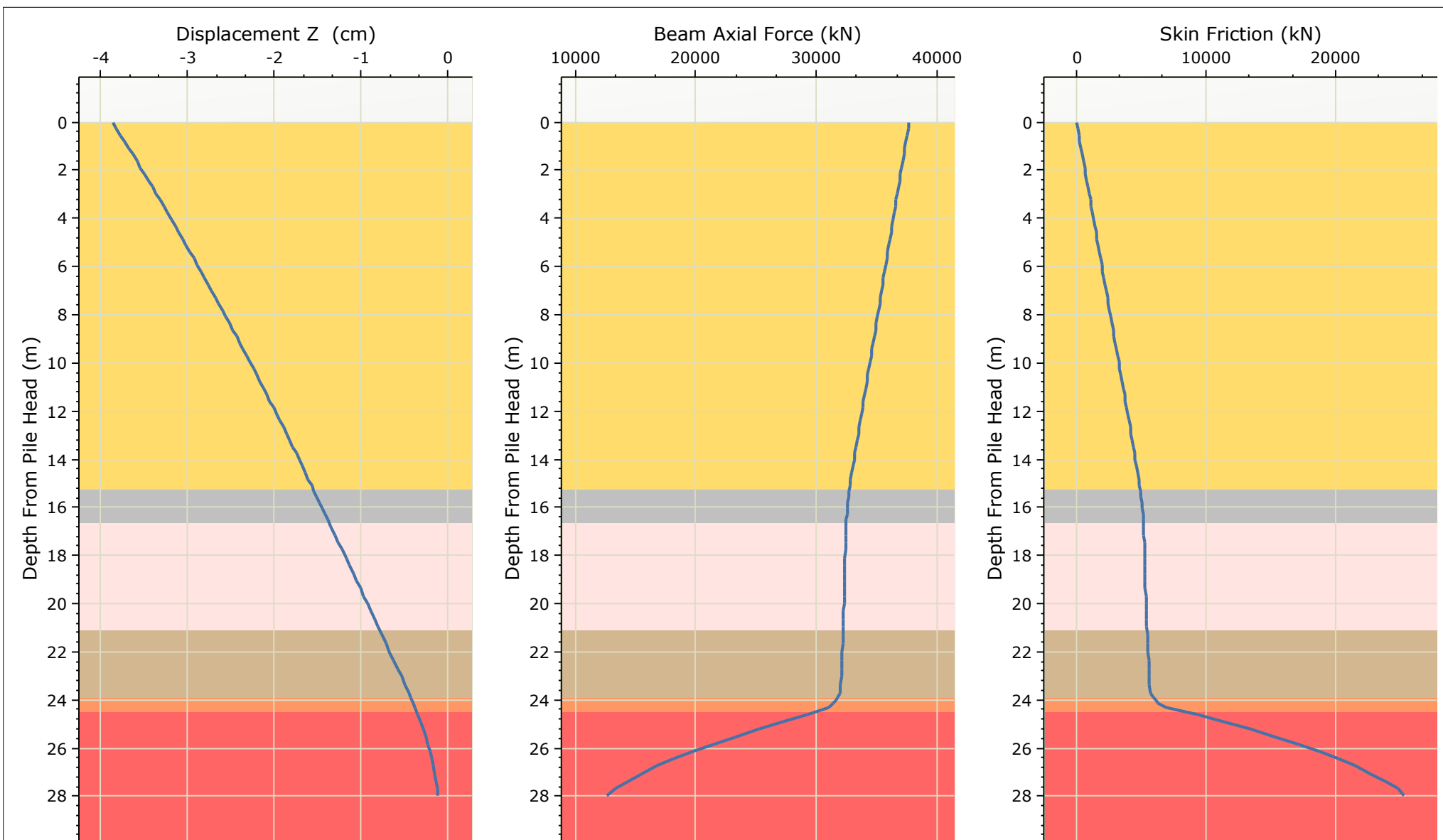
Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 23.18                    | -0.45               | 21475.51              | 4711.74            |
| 23.46                    | -0.41               | 21453.70              | 4733.56            |
| 23.73                    | -0.38               | 21415.43              | 4782.83            |
| 23.87                    | -0.36               | 21278.43              | 4974.64            |
| 24.01                    | -0.35               | 21124.98              | 5128.09            |
| 24.15                    | -0.33               | 20971.52              | 5281.54            |
| 24.29                    | -0.32               | 20656.41              | 5719.95            |
| 24.56                    | -0.29               | 19371.31              | 7528.35            |
| 24.83                    | -0.26               | 17914.59              | 8975.07            |
| 25.10                    | -0.24               | 16517.63              | 10342.23           |
| 25.37                    | -0.21               | 15183.86              | 11583.62           |
| 25.65                    | -0.20               | 14027.50              | 12714.20           |
| 25.92                    | -0.18               | 12924.15              | 13741.76           |
| 26.19                    | -0.16               | 11966.75              | 14677.71           |
| 26.46                    | -0.15               | 11053.33              | 15528.07           |
| 26.73                    | -0.13               | 10261.61              | 16301.75           |
| 27.00                    | -0.12               | 9681.36               | 16652.62           |



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Axial

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.20m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 0.00                     | -3.87               | 37677.10              | 43.70              |
| 0.27                     | -3.82               | 37611.46              | 131.09             |
| 0.54                     | -3.77               | 37523.94              | 218.49             |
| 0.81                     | -3.73               | 37436.42              | 305.89             |
| 1.08                     | -3.68               | 37348.91              | 393.28             |
| 1.35                     | -3.63               | 37261.40              | 480.68             |
| 1.62                     | -3.59               | 37173.89              | 568.08             |
| 1.89                     | -3.54               | 37086.39              | 655.47             |
| 2.16                     | -3.50               | 36998.89              | 742.87             |
| 2.43                     | -3.45               | 36911.40              | 830.27             |
| 2.70                     | -3.41               | 36823.90              | 917.66             |
| 2.97                     | -3.36               | 36736.41              | 1005.06            |
| 3.23                     | -3.32               | 36648.92              | 1092.45            |
| 3.50                     | -3.27               | 36561.44              | 1179.85            |
| 3.77                     | -3.23               | 36473.95              | 1267.25            |
| 4.04                     | -3.19               | 36386.47              | 1354.64            |
| 4.31                     | -3.14               | 36298.99              | 1442.04            |
| 4.58                     | -3.10               | 36211.51              | 1529.44            |
| 4.85                     | -3.06               | 36124.03              | 1616.83            |
| 5.12                     | -3.01               | 36036.55              | 1704.23            |
| 5.39                     | -2.97               | 35949.08              | 1791.62            |
| 5.66                     | -2.93               | 35861.60              | 1879.02            |
| 5.93                     | -2.89               | 35774.13              | 1966.42            |
| 6.20                     | -2.85               | 35686.66              | 2053.81            |
| 6.47                     | -2.80               | 35599.19              | 2141.21            |
| 6.74                     | -2.76               | 35511.73              | 2228.61            |
| 7.01                     | -2.72               | 35424.26              | 2316.00            |
| 7.28                     | -2.68               | 35336.79              | 2403.40            |
| 7.55                     | -2.64               | 35249.33              | 2490.79            |
| 7.82                     | -2.60               | 35161.87              | 2578.19            |
| 8.09                     | -2.56               | 35074.41              | 2665.59            |
| 8.36                     | -2.52               | 34986.95              | 2752.98            |
| 8.63                     | -2.48               | 34899.49              | 2840.38            |
| 8.90                     | -2.44               | 34812.03              | 2927.78            |
| 9.17                     | -2.40               | 34724.58              | 3015.17            |
| 9.43                     | -2.36               | 34637.12              | 3102.57            |
| 9.70                     | -2.32               | 34549.67              | 3189.97            |
| 9.97                     | -2.28               | 34462.22              | 3277.36            |
| 10.24                    | -2.24               | 34374.76              | 3364.76            |
| 10.51                    | -2.20               | 34287.31              | 3452.15            |
| 10.78                    | -2.16               | 34199.86              | 3539.55            |
| 11.05                    | -2.13               | 34112.42              | 3626.95            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 11.32                    | -2.09               | 34024.97              | 3714.34            |
| 11.59                    | -2.05               | 33937.52              | 3801.74            |
| 11.86                    | -2.01               | 33850.08              | 3889.14            |
| 12.13                    | -1.97               | 33762.64              | 3976.53            |
| 12.40                    | -1.94               | 33675.18              | 4042.11            |
| 12.67                    | -1.90               | 33587.61              | 4151.54            |
| 12.94                    | -1.86               | 33500.03              | 4239.07            |
| 13.21                    | -1.82               | 33412.45              | 4326.61            |
| 13.48                    | -1.79               | 33324.87              | 4414.15            |
| 13.75                    | -1.75               | 33237.29              | 4501.69            |
| 14.02                    | -1.71               | 33149.71              | 4589.22            |
| 14.29                    | -1.68               | 33062.14              | 4676.76            |
| 14.56                    | -1.64               | 32974.56              | 4764.30            |
| 14.83                    | -1.60               | 32886.99              | 4851.84            |
| 15.10                    | -1.57               | 32804.09              | 4908.14            |
| 15.33                    | -1.54               | 32749.26              | 4970.81            |
| 15.57                    | -1.51               | 32699.10              | 5020.95            |
| 15.80                    | -1.48               | 32648.94              | 5071.09            |
| 16.03                    | -1.44               | 32598.78              | 5121.23            |
| 16.27                    | -1.41               | 32548.62              | 5171.37            |
| 16.50                    | -1.38               | 32502.63              | 5200.64            |
| 16.82                    | -1.34               | 32481.66              | 5221.64            |
| 17.14                    | -1.30               | 32464.86              | 5238.43            |
| 17.45                    | -1.26               | 32448.06              | 5255.23            |
| 17.77                    | -1.22               | 32431.26              | 5272.03            |
| 18.09                    | -1.18               | 32414.46              | 5288.82            |
| 18.41                    | -1.13               | 32397.66              | 5305.62            |
| 18.73                    | -1.09               | 32380.86              | 5322.41            |
| 19.05                    | -1.05               | 32364.06              | 5339.21            |
| 19.36                    | -1.01               | 32347.26              | 5356.01            |
| 19.68                    | -0.97               | 32330.46              | 5372.80            |
| 20.00                    | -0.93               | 32313.66              | 5389.60            |
| 20.32                    | -0.89               | 32296.86              | 5406.39            |
| 20.64                    | -0.84               | 32280.06              | 5423.19            |
| 20.96                    | -0.80               | 32261.27              | 5439.77            |
| 21.30                    | -0.76               | 32230.53              | 5480.67            |
| 21.65                    | -0.71               | 32197.81              | 5513.39            |
| 22.00                    | -0.67               | 32165.08              | 5546.12            |
| 22.34                    | -0.62               | 32132.36              | 5578.84            |
| 22.69                    | -0.58               | 32099.63              | 5611.56            |
| 23.04                    | -0.53               | 32066.91              | 5644.28            |
| 23.39                    | -0.49               | 32034.18              | 5677.01            |

Trabajo: 2-1259

Proyecto: CAVAROSA

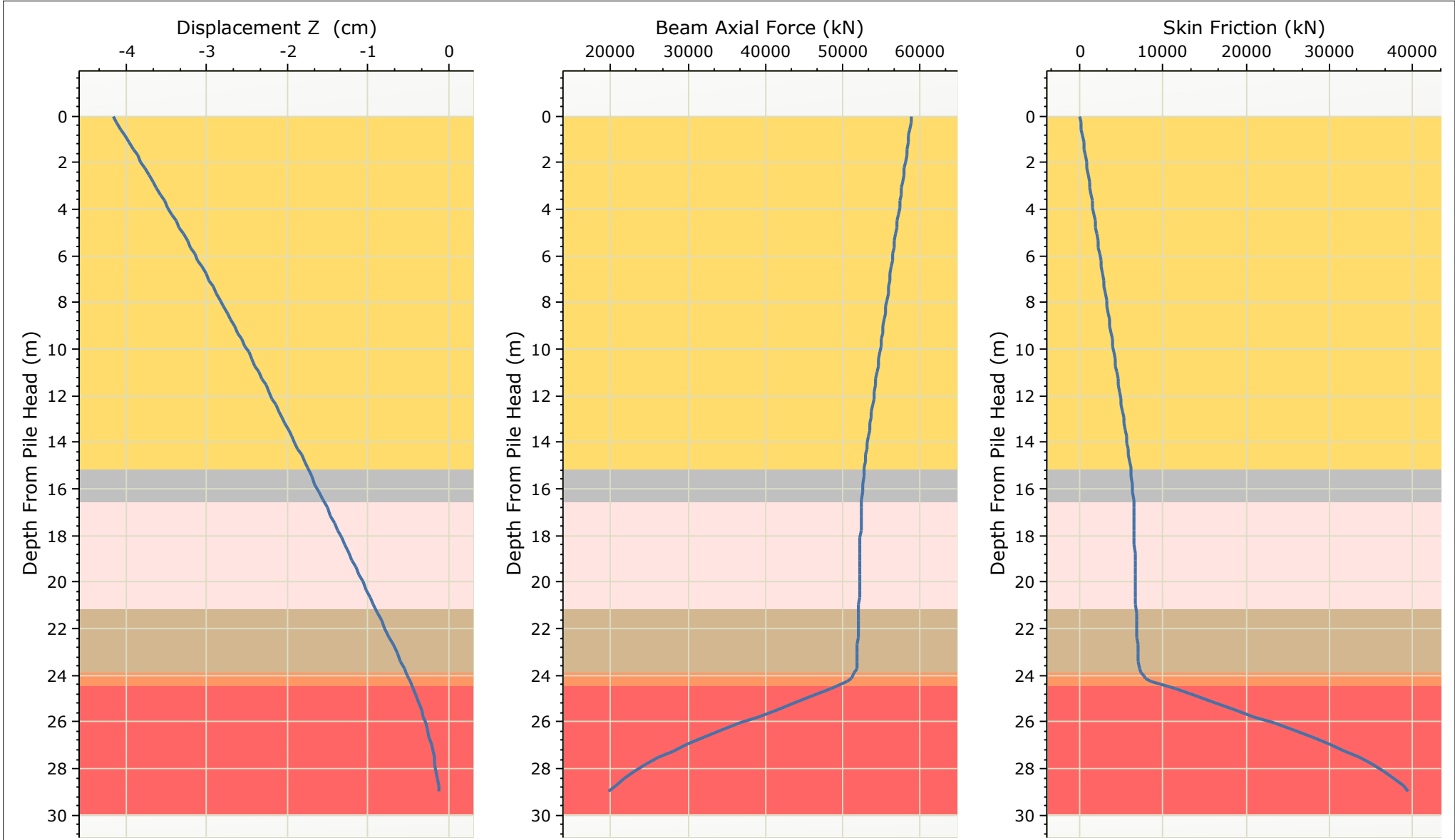
Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 23.73                    | -0.45               | 31982.53              | 5739.40            |
| 23.87                    | -0.43               | 31817.32              | 5969.57            |
| 24.01                    | -0.41               | 31633.18              | 6153.71            |
| 24.15                    | -0.39               | 31449.03              | 6337.84            |
| 24.29                    | -0.38               | 31040.30              | 6925.12            |
| 24.60                    | -0.34               | 29283.99              | 9401.16            |
| 24.91                    | -0.31               | 27303.08              | 11382.00           |
| 25.22                    | -0.28               | 25322.17              | 13362.83           |
| 25.53                    | -0.25               | 23318.33              | 15343.66           |
| 25.84                    | -0.23               | 21452.09              | 17141.19           |
| 26.15                    | -0.20               | 19700.62              | 18764.93           |
| 26.45                    | -0.19               | 18194.61              | 20235.12           |
| 26.76                    | -0.17               | 16762.14              | 21562.34           |
| 27.07                    | -0.15               | 15532.53              | 22762.02           |
| 27.38                    | -0.14               | 14364.21              | 23842.31           |
| 27.69                    | -0.12               | 13366.00              | 24815.18           |
| 28.00                    | -0.11               | 12636.36              | 25251.07           |



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Axial

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.50m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 0.00                     | -4.17               | 58876.28              | 57.11              |
| 0.28                     | -4.12               | 58790.46              | 171.32             |
| 0.56                     | -4.07               | 58676.05              | 285.53             |
| 0.85                     | -4.02               | 58561.64              | 399.74             |
| 1.13                     | -3.97               | 58447.25              | 513.95             |
| 1.41                     | -3.92               | 58332.86              | 628.16             |
| 1.69                     | -3.87               | 58218.48              | 742.37             |
| 1.97                     | -3.82               | 58104.10              | 856.58             |
| 2.25                     | -3.77               | 57989.73              | 970.79             |
| 2.54                     | -3.72               | 57875.37              | 1085.01            |
| 2.82                     | -3.67               | 57761.01              | 1199.22            |
| 3.10                     | -3.62               | 57646.65              | 1313.43            |
| 3.38                     | -3.57               | 57532.30              | 1427.64            |
| 3.66                     | -3.53               | 57417.95              | 1541.85            |
| 3.95                     | -3.48               | 57303.61              | 1656.06            |
| 4.23                     | -3.43               | 57189.27              | 1770.27            |
| 4.51                     | -3.38               | 57074.93              | 1884.48            |
| 4.79                     | -3.34               | 56960.59              | 1998.69            |
| 5.07                     | -3.29               | 56846.26              | 2112.91            |
| 5.35                     | -3.24               | 56731.93              | 2227.12            |
| 5.64                     | -3.20               | 56617.61              | 2341.33            |
| 5.92                     | -3.15               | 56503.28              | 2455.54            |
| 6.20                     | -3.11               | 56388.96              | 2569.75            |
| 6.48                     | -3.06               | 56274.64              | 2683.96            |
| 6.76                     | -3.01               | 56160.33              | 2798.17            |
| 7.05                     | -2.97               | 56046.01              | 2912.38            |
| 7.33                     | -2.92               | 55931.70              | 3026.59            |
| 7.61                     | -2.88               | 55817.39              | 3140.81            |
| 7.89                     | -2.83               | 55703.08              | 3255.02            |
| 8.17                     | -2.79               | 55588.78              | 3369.23            |
| 8.45                     | -2.75               | 55474.48              | 3483.44            |
| 8.74                     | -2.70               | 55360.17              | 3597.65            |
| 9.02                     | -2.66               | 55245.87              | 3711.86            |
| 9.30                     | -2.61               | 55131.58              | 3826.07            |
| 9.58                     | -2.57               | 55017.28              | 3940.28            |
| 9.86                     | -2.53               | 54902.99              | 4054.49            |
| 10.15                    | -2.48               | 54788.70              | 4168.71            |
| 10.43                    | -2.44               | 54674.41              | 4282.92            |
| 10.71                    | -2.40               | 54560.12              | 4397.13            |
| 10.99                    | -2.35               | 54445.83              | 4511.34            |
| 11.27                    | -2.31               | 54331.55              | 4625.55            |
| 11.55                    | -2.27               | 54217.26              | 4739.76            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 11.84                    | -2.23               | 54102.98              | 4853.97            |
| 12.12                    | -2.19               | 53988.70              | 4968.18            |
| 12.40                    | -2.14               | 53875.02              | 5052.64            |
| 12.67                    | -2.10               | 53764.94              | 5189.42            |
| 12.94                    | -2.06               | 53655.46              | 5298.84            |
| 13.21                    | -2.02               | 53545.98              | 5408.26            |
| 13.48                    | -1.98               | 53436.50              | 5517.69            |
| 13.75                    | -1.95               | 53327.02              | 5627.11            |
| 14.02                    | -1.91               | 53217.54              | 5736.53            |
| 14.29                    | -1.87               | 53108.07              | 5845.95            |
| 14.56                    | -1.83               | 52998.59              | 5955.37            |
| 14.83                    | -1.79               | 52889.12              | 6064.79            |
| 15.10                    | -1.75               | 52781.58              | 6143.01            |
| 15.45                    | -1.70               | 52685.60              | 6260.52            |
| 15.80                    | -1.65               | 52591.55              | 6354.53            |
| 16.15                    | -1.60               | 52497.50              | 6448.55            |
| 16.50                    | -1.55               | 52412.58              | 6500.80            |
| 16.82                    | -1.51               | 52382.45              | 6527.04            |
| 17.14                    | -1.46               | 52361.45              | 6548.03            |
| 17.45                    | -1.42               | 52340.45              | 6569.02            |
| 17.77                    | -1.37               | 52319.45              | 6590.02            |
| 18.09                    | -1.33               | 52298.45              | 6611.01            |
| 18.41                    | -1.28               | 52277.45              | 6632.00            |
| 18.73                    | -1.24               | 52256.46              | 6652.99            |
| 19.05                    | -1.20               | 52235.46              | 6673.99            |
| 19.36                    | -1.15               | 52214.46              | 6694.98            |
| 19.68                    | -1.11               | 52193.46              | 6715.97            |
| 20.00                    | -1.06               | 52172.47              | 6736.96            |
| 20.32                    | -1.02               | 52151.47              | 6757.95            |
| 20.64                    | -0.97               | 52130.48              | 6778.95            |
| 20.95                    | -0.93               | 52106.99              | 6799.67            |
| 21.30                    | -0.88               | 52068.56              | 6850.81            |
| 21.65                    | -0.83               | 52027.65              | 6891.72            |
| 22.00                    | -0.78               | 51986.73              | 6932.63            |
| 22.34                    | -0.74               | 51945.82              | 6973.54            |
| 22.69                    | -0.69               | 51904.90              | 7014.45            |
| 23.04                    | -0.64               | 51863.99              | 7055.36            |
| 23.39                    | -0.59               | 51823.08              | 7096.27            |
| 23.73                    | -0.54               | 51758.51              | 7174.27            |
| 23.87                    | -0.53               | 51552.00              | 7461.96            |
| 24.01                    | -0.51               | 51321.83              | 7692.12            |
| 24.15                    | -0.49               | 51091.67              | 7922.28            |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



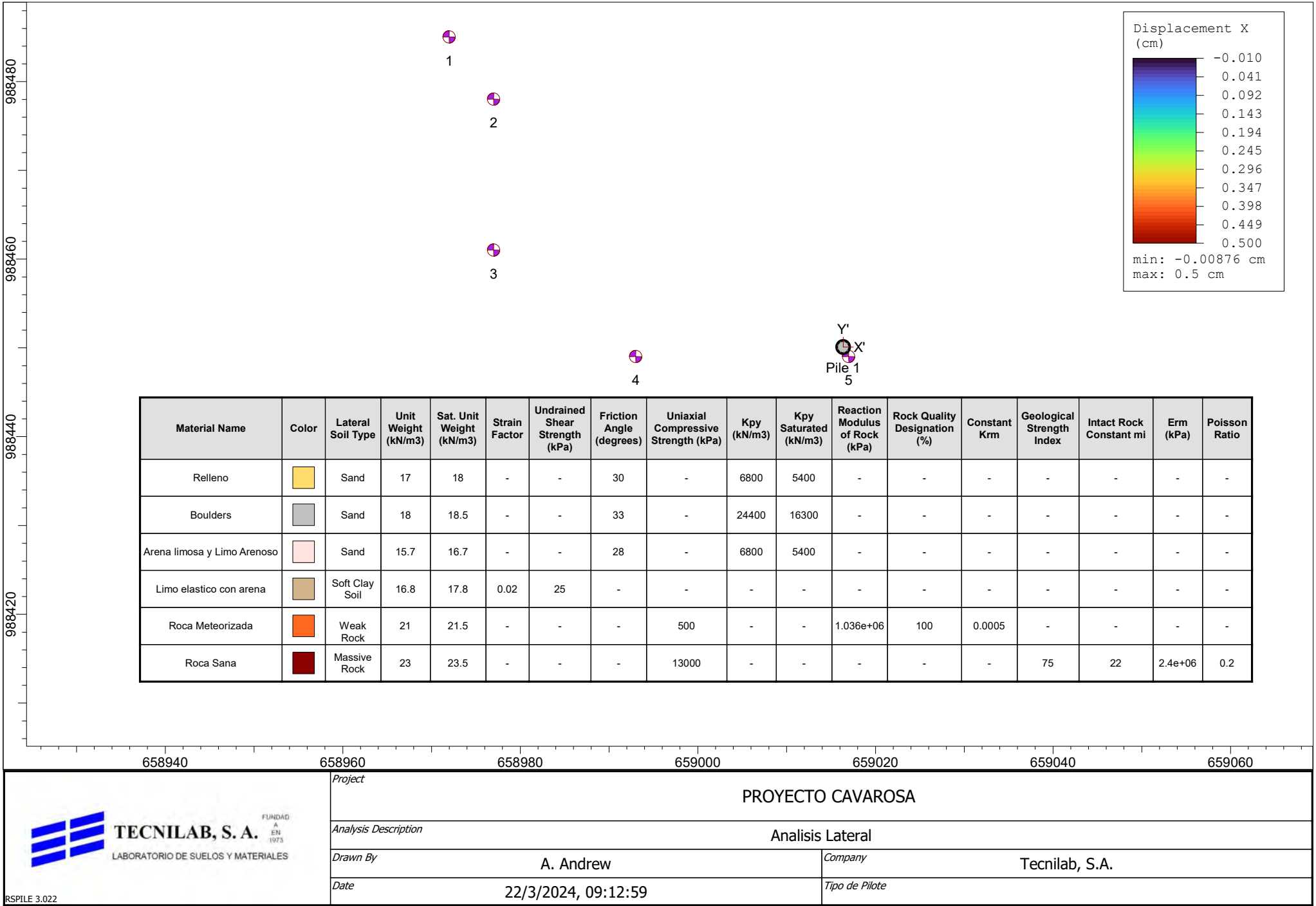
**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

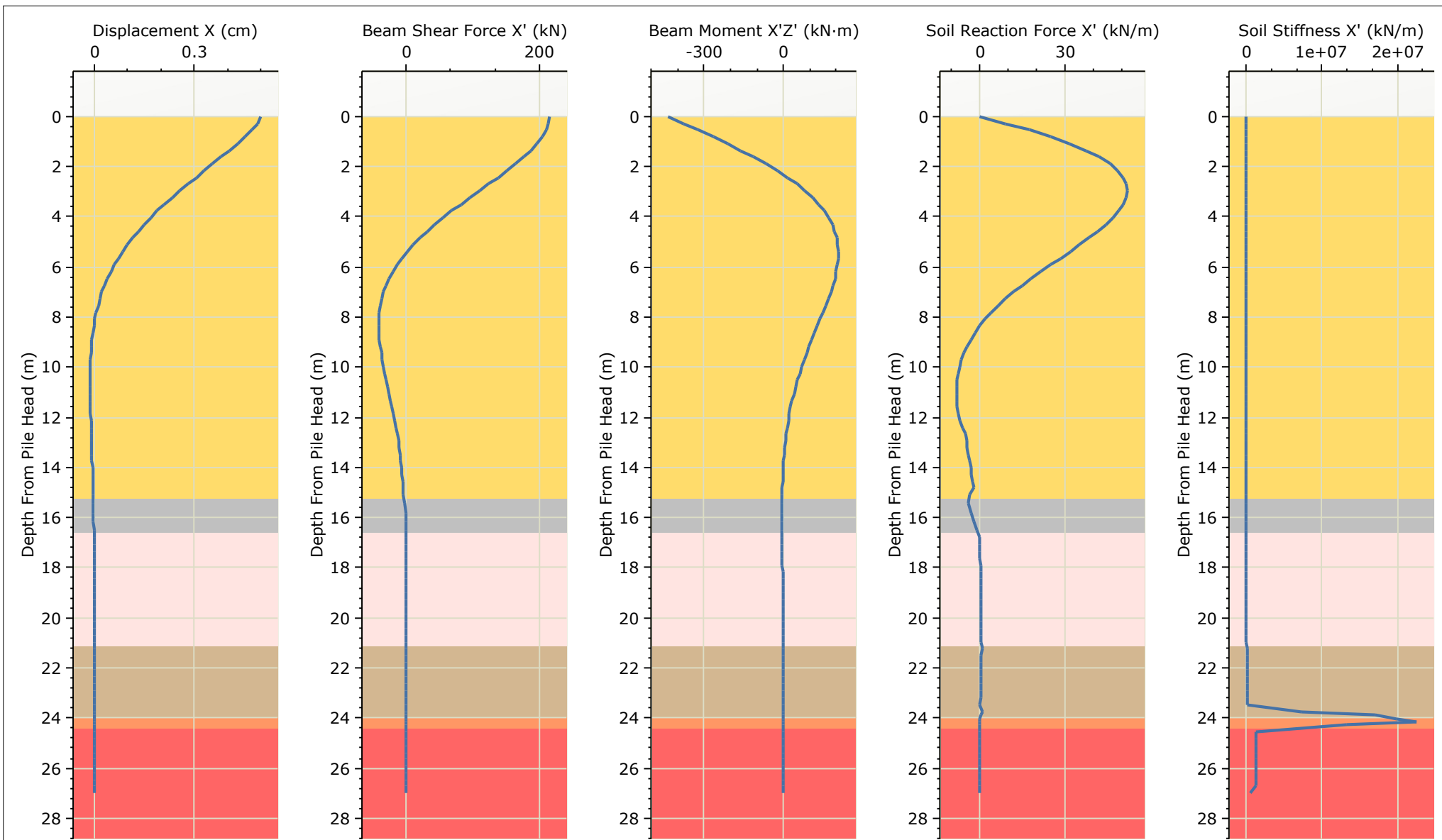
FUNDADA  
EN  
1973

| D=1.50m                  |                     |                       |                    |
|--------------------------|---------------------|-----------------------|--------------------|
| Depth From Pile Head (m) | Displacement Z (cm) | Beam Axial Force (kN) | Skin Friction (kN) |
| 24.29                    | -0.47               | 50595.54              | 8626.81            |
| 24.59                    | -0.43               | 48503.62              | 11574.04           |
| 24.88                    | -0.40               | 46145.71              | 13931.83           |
| 25.17                    | -0.36               | 43787.78              | 16289.63           |
| 25.47                    | -0.33               | 41429.86              | 18647.42           |
| 25.76                    | -0.31               | 39071.94              | 21005.21           |
| 26.06                    | -0.28               | 36714.03              | 23363.00           |
| 26.35                    | -0.26               | 34356.13              | 25720.79           |
| 26.65                    | -0.23               | 32029.48              | 27933.47           |
| 26.94                    | -0.21               | 29951.31              | 29960.15           |
| 27.23                    | -0.20               | 27970.48              | 31811.79           |
| 27.53                    | -0.18               | 26240.01              | 33504.64           |
| 27.82                    | -0.16               | 24586.35              | 35047.36           |
| 28.12                    | -0.15               | 23148.22              | 36452.82           |
| 28.41                    | -0.14               | 21776.65              | 37727.94           |
| 28.71                    | -0.12               | 20592.89              | 38882.99           |
| 29.00                    | -0.11               | 19726.63              | 39403.21           |



**APENDICE E**  
**ANALISIS LATERAL DE PILOTES**





**TECNILAB, S. A.**

LABORATORIO DE SUELOS Y MATERIALES

FUNDACIÓN  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Lateral

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.00m

Trabajo: 2-1259

Proyecto: CAVAROSA

Ciente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 0.00                     | 0.50                | 214.49                   | -437.20                 | 0.00                          | 0.00                     |
| 0.27                     | 0.49                | 212.67                   | -379.87                 | 9.00                          | 494.12                   |
| 0.54                     | 0.48                | 209.65                   | -322.32                 | 17.43                         | 988.25                   |
| 0.81                     | 0.45                | 203.40                   | -267.36                 | 24.99                         | 1482.37                  |
| 1.08                     | 0.43                | 196.18                   | -212.49                 | 31.59                         | 1976.50                  |
| 1.35                     | 0.41                | 186.49                   | -162.09                 | 37.25                         | 2470.62                  |
| 1.62                     | 0.38                | 176.10                   | -111.74                 | 41.96                         | 2964.75                  |
| 1.89                     | 0.36                | 164.00                   | -67.46                  | 45.73                         | 3458.87                  |
| 2.16                     | 0.33                | 151.45                   | -23.21                  | 48.57                         | 3952.99                  |
| 2.43                     | 0.31                | 137.93                   | 14.02                   | 50.53                         | 4447.12                  |
| 2.70                     | 0.28                | 124.21                   | 51.21                   | 51.64                         | 4941.24                  |
| 2.97                     | 0.26                | 110.19                   | 80.93                   | 51.97                         | 5435.37                  |
| 3.23                     | 0.23                | 96.19                    | 110.62                  | 51.58                         | 5929.49                  |
| 3.50                     | 0.21                | 82.47                    | 132.84                  | 50.56                         | 6423.62                  |
| 3.77                     | 0.19                | 68.93                    | 155.04                  | 48.94                         | 6917.74                  |
| 4.04                     | 0.17                | 56.15                    | 170.14                  | 46.86                         | 7411.87                  |
| 4.31                     | 0.15                | 43.67                    | 185.22                  | 44.35                         | 7905.99                  |
| 4.58                     | 0.13                | 32.28                    | 193.88                  | 41.52                         | 8400.11                  |
| 4.85                     | 0.12                | 21.29                    | 202.52                  | 38.41                         | 8894.24                  |
| 5.12                     | 0.10                | 11.59                    | 205.59                  | 35.13                         | 9388.36                  |
| 5.39                     | 0.09                | 2.35                     | 208.65                  | 31.72                         | 9882.49                  |
| 5.66                     | 0.07                | -5.50                    | 207.10                  | 28.26                         | 10376.61                 |
| 5.93                     | 0.06                | -12.88                   | 205.56                  | 24.78                         | 10870.74                 |
| 6.20                     | 0.05                | -18.87                   | 200.41                  | 21.37                         | 11364.86                 |
| 6.47                     | 0.04                | -24.40                   | 195.26                  | 18.04                         | 11858.98                 |
| 6.74                     | 0.03                | -28.61                   | 187.49                  | 14.85                         | 12353.11                 |
| 7.01                     | 0.02                | -32.41                   | 179.72                  | 11.81                         | 12847.23                 |
| 7.28                     | 0.02                | -35.01                   | 170.23                  | 8.97                          | 13341.36                 |
| 7.55                     | 0.01                | -37.24                   | 160.75                  | 6.33                          | 13835.48                 |
| 7.82                     | 0.01                | -38.45                   | 150.34                  | 3.92                          | 14329.61                 |
| 8.09                     | 0.00                | -39.35                   | 139.93                  | 1.73                          | 14823.73                 |
| 8.36                     | 0.00                | -39.42                   | 129.27                  | -0.22                         | 15317.86                 |
| 8.63                     | 0.00                | -39.23                   | 118.62                  | -1.93                         | 15811.98                 |
| 8.90                     | -0.01               | -38.41                   | 108.24                  | -3.42                         | 16306.10                 |
| 9.17                     | -0.01               | -37.39                   | 97.86                   | -4.67                         | 16800.23                 |
| 9.43                     | -0.01               | -35.91                   | 88.16                   | -5.72                         | 17294.35                 |
| 9.70                     | -0.01               | -34.31                   | 78.46                   | -6.56                         | 17788.48                 |
| 9.97                     | -0.01               | -32.40                   | 69.72                   | -7.21                         | 18282.60                 |
| 10.24                    | -0.01               | -30.42                   | 60.97                   | -7.68                         | 18776.73                 |
| 10.51                    | -0.01               | -28.28                   | 53.34                   | -8.01                         | 19270.85                 |
| 10.78                    | -0.01               | -26.11                   | 45.72                   | -8.17                         | 19764.97                 |
| 11.05                    | -0.01               | -23.89                   | 39.28                   | -8.22                         | 20259.10                 |

Trabajo: 2-1259

Proyecto: CAVAROSA

Ciente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 11.32                    | -0.01               | -21.68                   | 32.84                   | -8.15                         | 20753.22                 |
| 11.59                    | -0.01               | -19.51                   | 27.58                   | -8.00                         | 21247.35                 |
| 11.86                    | -0.01               | -17.36                   | 22.33                   | -7.75                         | 21741.47                 |
| 12.13                    | -0.01               | -15.33                   | 18.20                   | -7.45                         | 22235.60                 |
| 12.40                    | -0.01               | -13.40                   | 14.09                   | -6.36                         | 20404.50                 |
| 12.67                    | -0.01               | -11.90                   | 10.89                   | -5.31                         | 18472.86                 |
| 12.94                    | -0.01               | -10.49                   | 7.69                    | -4.95                         | 18866.52                 |
| 13.21                    | -0.01               | -9.23                    | 5.20                    | -4.58                         | 19260.18                 |
| 13.48                    | -0.01               | -8.02                    | 2.72                    | -4.18                         | 19653.84                 |
| 13.75                    | -0.01               | -6.97                    | 0.85                    | -3.78                         | 20047.50                 |
| 14.02                    | 0.00                | -5.97                    | -1.03                   | -3.38                         | 20441.16                 |
| 14.29                    | 0.00                | -5.14                    | -2.41                   | -2.98                         | 20834.82                 |
| 14.56                    | 0.00                | -4.36                    | -3.79                   | -2.58                         | 21228.48                 |
| 14.83                    | 0.00                | -3.75                    | -4.79                   | -2.20                         | 21622.14                 |
| 15.10                    | 0.00                | -2.95                    | -5.85                   | -3.68                         | 54080.64                 |
| 15.45                    | 0.00                | -1.49                    | -6.42                   | -4.25                         | 88142.49                 |
| 15.80                    | 0.00                | -0.11                    | -6.91                   | -3.13                         | 90139.26                 |
| 16.15                    | 0.00                | 0.74                     | -6.62                   | -2.21                         | 92136.02                 |
| 16.50                    | 0.00                | 1.37                     | -6.33                   | -0.96                         | 59472.63                 |
| 16.78                    | 0.00                | 1.49                     | -5.88                   | -0.31                         | 25231.62                 |
| 17.06                    | 0.00                | 1.56                     | -5.47                   | -0.17                         | 25650.41                 |
| 17.34                    | 0.00                | 1.59                     | -5.02                   | -0.05                         | 26069.19                 |
| 17.61                    | 0.00                | 1.59                     | -4.58                   | 0.05                          | 26487.98                 |
| 17.89                    | 0.00                | 1.56                     | -4.14                   | 0.13                          | 26906.76                 |
| 18.17                    | 0.00                | 1.52                     | -3.71                   | 0.19                          | 27325.55                 |
| 18.45                    | 0.00                | 1.46                     | -3.30                   | 0.23                          | 27744.33                 |
| 18.73                    | 0.00                | 1.39                     | -2.89                   | 0.26                          | 28163.12                 |
| 19.01                    | 0.00                | 1.32                     | -2.52                   | 0.28                          | 28581.90                 |
| 19.28                    | 0.00                | 1.24                     | -2.16                   | 0.29                          | 29000.69                 |
| 19.56                    | 0.00                | 1.15                     | -1.84                   | 0.29                          | 29419.47                 |
| 19.84                    | 0.00                | 1.07                     | -1.51                   | 0.28                          | 29838.26                 |
| 20.12                    | 0.00                | 1.00                     | -1.24                   | 0.27                          | 30257.04                 |
| 20.40                    | 0.00                | 0.93                     | -0.96                   | 0.24                          | 30675.83                 |
| 20.68                    | 0.00                | 0.86                     | -0.72                   | 0.22                          | 31094.61                 |
| 20.96                    | 0.00                | 0.78                     | -0.48                   | 0.44                          | 73307.25                 |
| 21.23                    | 0.00                | 0.63                     | -0.30                   | 0.58                          | 115101.62                |
| 21.51                    | 0.00                | 0.47                     | -0.13                   | 0.48                          | 115101.62                |
| 21.79                    | 0.00                | 0.36                     | -0.03                   | 0.39                          | 115101.62                |
| 22.07                    | 0.00                | 0.26                     | 0.07                    | 0.31                          | 115101.62                |
| 22.34                    | 0.00                | 0.19                     | 0.12                    | 0.24                          | 115101.62                |
| 22.62                    | 0.00                | 0.13                     | 0.17                    | 0.17                          | 115101.62                |
| 22.90                    | 0.00                | 0.09                     | 0.20                    | 0.12                          | 115101.62                |
| 23.18                    | 0.00                | 0.06                     | 0.22                    | 0.08                          | 115101.62                |

Trabajo: 2-1259

Proyecto: CAVAROSA

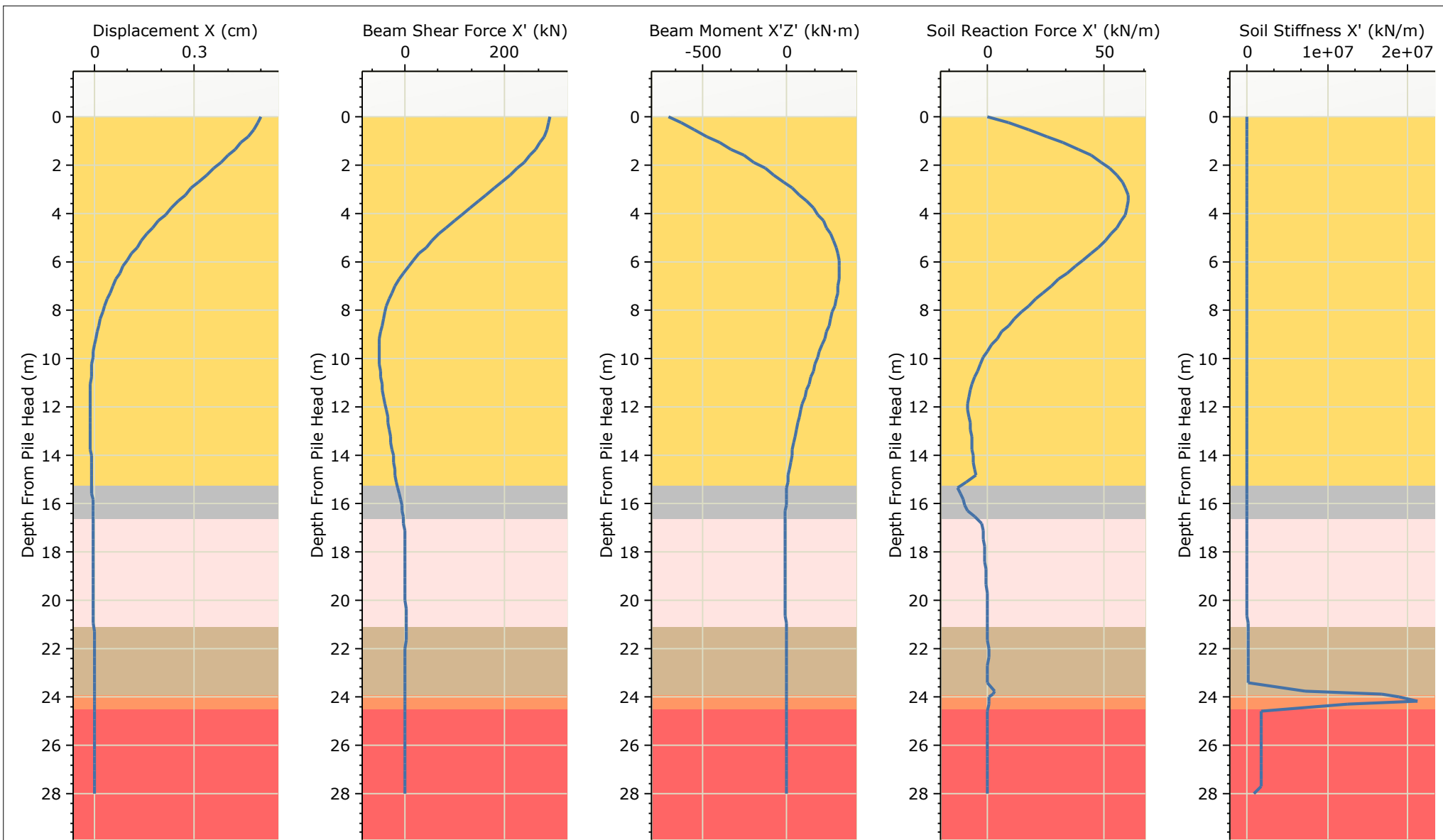
Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.00m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 23.46                    | 0.00                | 0.05                     | 0.23                    | 0.04                          | 115101.62                |
| 23.73                    | 0.00                | -0.02                    | 0.25                    | 0.99                          | 7286767.78               |
| 23.87                    | 0.00                | -0.14                    | 0.23                    | 0.54                          | 17148708.56              |
| 24.01                    | 0.00                | -0.18                    | 0.21                    | -0.01                         | 19839024.21              |
| 24.15                    | 0.00                | -0.16                    | 0.19                    | -0.19                         | 22529339.87              |
| 24.29                    | 0.00                | -0.13                    | 0.16                    | -0.23                         | 13254098.81              |
| 24.56                    | 0.00                | -0.11                    | 0.13                    | -0.04                         | 1288546.88               |
| 24.83                    | 0.00                | -0.09                    | 0.11                    | -0.05                         | 1288622.86               |
| 25.10                    | 0.00                | -0.08                    | 0.08                    | -0.05                         | 1288698.04               |
| 25.37                    | 0.00                | -0.07                    | 0.06                    | -0.04                         | 1288772.18               |
| 25.65                    | 0.00                | -0.06                    | 0.05                    | -0.04                         | 1288845.56               |
| 25.92                    | 0.00                | -0.05                    | 0.03                    | -0.03                         | 1288917.94               |
| 26.19                    | 0.00                | -0.04                    | 0.02                    | -0.03                         | 1288989.56               |
| 26.46                    | 0.00                | -0.03                    | 0.01                    | -0.04                         | 1289060.27               |
| 26.73                    | 0.00                | -0.02                    | 0.00                    | -0.05                         | 1289130.24               |
| 27.00                    | 0.00                | -0.01                    | 0.00                    | -0.08                         | 644599.68                |



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Lateral

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.20m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 0.00                     | 0.50                | 290.26                   | -707.08                 | 0.00                          | 0.00                     |
| 0.27                     | 0.49                | 288.43                   | -629.37                 | 9.02                          | 494.12                   |
| 0.54                     | 0.48                | 285.40                   | -551.18                 | 17.56                         | 988.25                   |
| 0.81                     | 0.46                | 279.06                   | -475.83                 | 25.38                         | 1482.37                  |
| 1.08                     | 0.44                | 271.72                   | -400.76                 | 32.40                         | 1976.50                  |
| 1.35                     | 0.42                | 261.70                   | -330.02                 | 38.64                         | 2470.62                  |
| 1.62                     | 0.40                | 250.89                   | -259.38                 | 44.06                         | 2964.75                  |
| 1.89                     | 0.38                | 238.06                   | -195.12                 | 48.68                         | 3458.87                  |
| 2.16                     | 0.36                | 224.65                   | -130.89                 | 52.47                         | 3952.99                  |
| 2.43                     | 0.34                | 209.87                   | -74.25                  | 55.47                         | 4447.12                  |
| 2.70                     | 0.31                | 194.75                   | -17.64                  | 57.69                         | 4941.24                  |
| 2.97                     | 0.29                | 178.87                   | 30.61                   | 59.19                         | 5435.37                  |
| 3.23                     | 0.27                | 162.84                   | 78.83                   | 59.97                         | 5929.49                  |
| 3.50                     | 0.25                | 146.62                   | 118.37                  | 60.10                         | 6423.62                  |
| 3.77                     | 0.23                | 130.44                   | 157.88                  | 59.62                         | 6917.74                  |
| 4.04                     | 0.21                | 114.55                   | 188.74                  | 58.61                         | 7411.87                  |
| 4.31                     | 0.19                | 98.84                    | 219.59                  | 57.08                         | 7905.99                  |
| 4.58                     | 0.18                | 83.83                    | 242.16                  | 55.14                         | 8400.11                  |
| 4.85                     | 0.16                | 69.12                    | 264.71                  | 52.79                         | 8894.24                  |
| 5.12                     | 0.14                | 55.41                    | 279.60                  | 50.15                         | 9388.36                  |
| 5.39                     | 0.13                | 42.08                    | 294.49                  | 47.23                         | 9882.49                  |
| 5.66                     | 0.11                | 29.97                    | 302.51                  | 44.12                         | 10376.61                 |
| 5.93                     | 0.10                | 18.30                    | 310.53                  | 40.84                         | 10870.74                 |
| 6.20                     | 0.09                | 7.97                     | 312.62                  | 37.47                         | 11364.86                 |
| 6.47                     | 0.08                | -1.90                    | 314.70                  | 34.02                         | 11858.98                 |
| 6.74                     | 0.07                | -10.37                   | 311.84                  | 30.58                         | 12353.11                 |
| 7.01                     | 0.06                | -18.38                   | 308.99                  | 27.14                         | 12847.23                 |
| 7.28                     | 0.05                | -25.01                   | 302.18                  | 23.78                         | 13341.36                 |
| 7.55                     | 0.04                | -31.20                   | 295.38                  | 20.49                         | 13835.48                 |
| 7.82                     | 0.03                | -36.08                   | 285.60                  | 17.34                         | 14329.61                 |
| 8.09                     | 0.03                | -40.54                   | 275.82                  | 14.31                         | 14823.73                 |
| 8.36                     | 0.02                | -43.82                   | 263.95                  | 11.45                         | 15317.86                 |
| 8.63                     | 0.01                | -46.72                   | 252.09                  | 8.76                          | 15811.98                 |
| 8.90                     | 0.01                | -48.57                   | 238.95                  | 6.26                          | 16306.10                 |
| 9.17                     | 0.01                | -50.09                   | 225.82                  | 3.95                          | 16800.23                 |
| 9.43                     | 0.00                | -50.72                   | 212.11                  | 1.85                          | 17294.35                 |
| 9.70                     | 0.00                | -51.09                   | 198.40                  | -0.06                         | 17788.48                 |
| 9.97                     | 0.00                | -50.72                   | 184.70                  | -1.76                         | 18282.60                 |
| 10.24                    | 0.00                | -50.14                   | 171.00                  | -3.26                         | 18776.73                 |
| 10.51                    | -0.01               | -48.98                   | 157.77                  | -4.58                         | 19270.85                 |
| 10.78                    | -0.01               | -47.67                   | 144.55                  | -5.69                         | 19764.97                 |
| 11.05                    | -0.01               | -45.94                   | 132.15                  | -6.64                         | 20259.10                 |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 11.32                    | -0.01               | -44.09                   | 119.75                  | -7.40                         | 20753.22                 |
| 11.59                    | -0.01               | -41.97                   | 108.42                  | -8.01                         | 21247.35                 |
| 11.86                    | -0.01               | -39.78                   | 97.10                   | -8.46                         | 21741.47                 |
| 12.13                    | -0.01               | -37.43                   | 87.01                   | -8.78                         | 22235.60                 |
| 12.40                    | -0.01               | -35.10                   | 76.93                   | -8.04                         | 20404.50                 |
| 12.67                    | -0.01               | -33.10                   | 68.01                   | -7.18                         | 18472.86                 |
| 12.94                    | -0.01               | -31.17                   | 59.07                   | -7.14                         | 18866.52                 |
| 13.21                    | -0.01               | -29.26                   | 51.17                   | -7.02                         | 19260.18                 |
| 13.48                    | -0.01               | -27.38                   | 43.28                   | -6.83                         | 19653.84                 |
| 13.75                    | -0.01               | -25.58                   | 36.37                   | -6.57                         | 20047.50                 |
| 14.02                    | -0.01               | -23.83                   | 29.47                   | -6.26                         | 20441.16                 |
| 14.29                    | -0.01               | -22.21                   | 23.48                   | -5.91                         | 20834.82                 |
| 14.56                    | -0.01               | -20.64                   | 17.49                   | -5.51                         | 21228.48                 |
| 14.83                    | -0.01               | -19.24                   | 12.31                   | -5.09                         | 21622.14                 |
| 15.10                    | -0.01               | -17.62                   | 7.07                    | -9.31                         | 39723.14                 |
| 15.33                    | -0.01               | -14.79                   | 3.58                    | -12.84                        | 58317.94                 |
| 15.57                    | 0.00                | -11.86                   | 0.14                    | -11.73                        | 59205.39                 |
| 15.80                    | 0.00                | -9.31                    | -2.01                   | -10.70                        | 60092.84                 |
| 16.03                    | 0.00                | -6.87                    | -4.17                   | -9.73                         | 60980.28                 |
| 16.27                    | 0.00                | -4.76                    | -5.27                   | -8.86                         | 61867.73                 |
| 16.50                    | 0.00                | -2.88                    | -6.35                   | -5.36                         | 45555.00                 |
| 16.82                    | 0.00                | -1.99                    | -6.95                   | -2.33                         | 28901.71                 |
| 17.14                    | 0.00                | -1.27                    | -7.58                   | -2.02                         | 29448.59                 |
| 17.45                    | 0.00                | -0.70                    | -7.79                   | -1.73                         | 29995.47                 |
| 17.77                    | 0.00                | -0.17                    | -8.01                   | -1.46                         | 30542.35                 |
| 18.09                    | 0.00                | 0.23                     | -7.93                   | -1.22                         | 31089.23                 |
| 18.41                    | 0.00                | 0.60                     | -7.85                   | -0.99                         | 31636.11                 |
| 18.73                    | 0.00                | 0.87                     | -7.57                   | -0.80                         | 32182.99                 |
| 19.05                    | 0.00                | 1.11                     | -7.28                   | -0.62                         | 32729.87                 |
| 19.36                    | 0.00                | 1.27                     | -6.88                   | -0.47                         | 33276.75                 |
| 19.68                    | 0.00                | 1.41                     | -6.47                   | -0.35                         | 33823.63                 |
| 20.00                    | 0.00                | 1.49                     | -5.99                   | -0.24                         | 34370.51                 |
| 20.32                    | 0.00                | 1.56                     | -5.51                   | -0.15                         | 34917.39                 |
| 20.64                    | 0.00                | 1.59                     | -5.00                   | -0.08                         | 35464.27                 |
| 20.96                    | 0.00                | 1.62                     | -4.49                   | -0.06                         | 99252.24                 |
| 21.30                    | 0.00                | 1.61                     | -3.93                   | 0.08                          | 162492.87                |
| 21.65                    | 0.00                | 1.57                     | -3.37                   | 0.19                          | 162492.87                |
| 22.00                    | 0.00                | 1.49                     | -2.85                   | 0.24                          | 162492.87                |
| 22.34                    | 0.00                | 1.40                     | -2.34                   | 0.25                          | 162492.87                |
| 22.69                    | 0.00                | 1.32                     | -1.88                   | 0.23                          | 162492.87                |
| 23.04                    | 0.00                | 1.25                     | -1.42                   | 0.18                          | 162492.87                |
| 23.39                    | 0.00                | 1.20                     | -1.00                   | 0.11                          | 162492.87                |
| 23.73                    | 0.00                | 1.02                     | -0.58                   | 2.92                          | 7310484.35               |

Trabajo: 2-1259

Proyecto: CAVAROSA

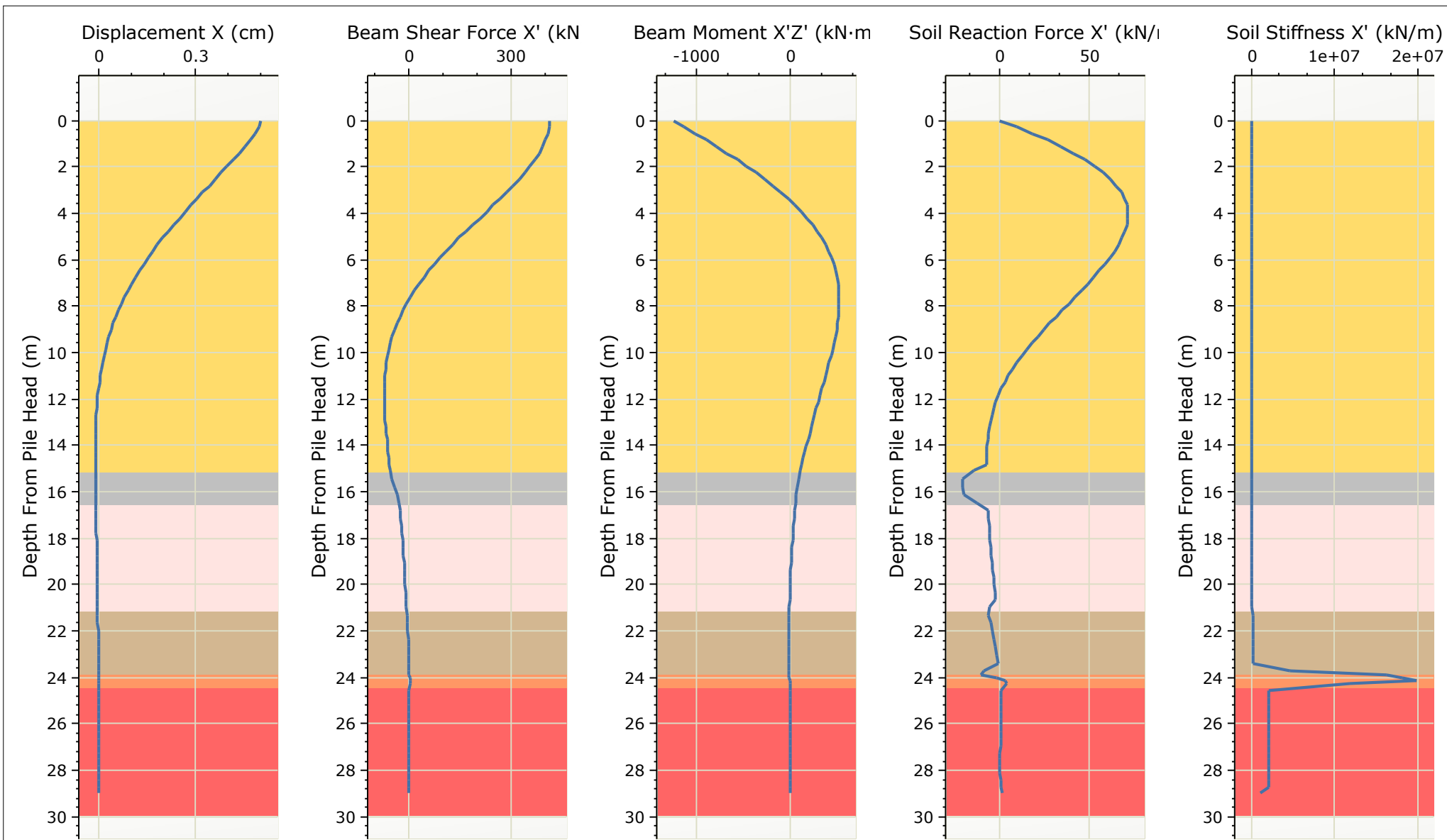
Ciente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.20m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 23.87                    | 0.00                | 0.60                     | -0.49                   | 2.47                          | 16700234.27              |
| 24.01                    | 0.00                | 0.34                     | -0.41                   | 0.79                          | 18942034.61              |
| 24.15                    | 0.00                | 0.28                     | -0.38                   | 0.54                          | 21183834.95              |
| 24.29                    | 0.00                | 0.21                     | -0.34                   | 0.36                          | 12596214.59              |
| 24.60                    | 0.00                | 0.18                     | -0.28                   | 0.06                          | 1766847.30               |
| 24.91                    | 0.00                | 0.16                     | -0.23                   | 0.07                          | 1766966.11               |
| 25.22                    | 0.00                | 0.14                     | -0.19                   | 0.07                          | 1767083.32               |
| 25.53                    | 0.00                | 0.11                     | -0.14                   | 0.06                          | 1767198.85               |
| 25.84                    | 0.00                | 0.10                     | -0.11                   | 0.06                          | 1767312.90               |
| 26.15                    | 0.00                | 0.08                     | -0.08                   | 0.04                          | 1767425.31               |
| 26.45                    | 0.00                | 0.07                     | -0.06                   | 0.04                          | 1767536.30               |
| 26.76                    | 0.00                | 0.06                     | -0.04                   | 0.03                          | 1767645.74               |
| 27.07                    | 0.00                | 0.05                     | -0.03                   | 0.03                          | 1767753.84               |
| 27.38                    | 0.00                | 0.04                     | -0.01                   | 0.04                          | 1767860.44               |
| 27.69                    | 0.00                | 0.02                     | -0.01                   | 0.06                          | 1767965.74               |
| 28.00                    | 0.00                | 0.01                     | 0.00                    | 0.09                          | 884034.84                |



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Analisis Lateral

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.50m

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 0.00                     | 0.50                | 415.65                   | -1245.60                | 0.00                          | 0.00                     |
| 0.28                     | 0.49                | 413.66                   | -1129.12                | 9.44                          | 540.07                   |
| 0.56                     | 0.48                | 410.34                   | -1011.53                | 18.43                         | 1080.13                  |
| 0.85                     | 0.47                | 403.36                   | -897.89                 | 26.78                         | 1620.20                  |
| 1.13                     | 0.45                | 395.25                   | -784.89                 | 34.44                         | 2160.26                  |
| 1.41                     | 0.43                | 384.05                   | -676.21                 | 41.39                         | 2700.33                  |
| 1.69                     | 0.41                | 371.92                   | -567.86                 | 47.61                         | 3240.39                  |
| 1.97                     | 0.40                | 357.32                   | -467.04                 | 53.09                         | 3780.46                  |
| 2.25                     | 0.38                | 342.00                   | -366.25                 | 57.82                         | 4320.53                  |
| 2.54                     | 0.36                | 324.83                   | -274.62                 | 61.82                         | 4860.59                  |
| 2.82                     | 0.34                | 307.16                   | -183.02                 | 65.08                         | 5400.66                  |
| 3.10                     | 0.32                | 288.25                   | -101.73                 | 67.64                         | 5940.72                  |
| 3.38                     | 0.30                | 269.03                   | -20.47                  | 69.51                         | 6480.79                  |
| 3.66                     | 0.28                | 249.16                   | 49.78                   | 70.72                         | 7020.85                  |
| 3.95                     | 0.27                | 229.17                   | 120.01                  | 71.30                         | 7560.92                  |
| 4.23                     | 0.25                | 209.05                   | 178.93                  | 71.32                         | 8100.99                  |
| 4.51                     | 0.23                | 188.98                   | 237.83                  | 70.77                         | 8641.05                  |
| 4.79                     | 0.21                | 169.23                   | 285.50                  | 69.74                         | 9181.12                  |
| 5.07                     | 0.20                | 149.67                   | 333.16                  | 68.24                         | 9721.18                  |
| 5.35                     | 0.18                | 130.82                   | 370.00                  | 66.36                         | 10261.25                 |
| 5.64                     | 0.17                | 112.27                   | 406.82                  | 64.09                         | 10801.32                 |
| 5.92                     | 0.15                | 94.74                    | 433.47                  | 61.53                         | 11341.38                 |
| 6.20                     | 0.14                | 77.60                    | 460.12                  | 58.68                         | 11881.45                 |
| 6.48                     | 0.13                | 61.70                    | 477.44                  | 55.63                         | 12421.51                 |
| 6.76                     | 0.11                | 46.24                    | 494.77                  | 52.39                         | 12961.58                 |
| 7.05                     | 0.10                | 32.19                    | 503.77                  | 49.03                         | 13501.64                 |
| 7.33                     | 0.09                | 18.61                    | 512.77                  | 45.55                         | 14041.71                 |
| 7.61                     | 0.08                | 6.52                     | 514.54                  | 42.03                         | 14581.78                 |
| 7.89                     | 0.07                | -5.07                    | 516.31                  | 38.47                         | 15121.84                 |
| 8.17                     | 0.06                | -15.17                   | 511.96                  | 34.94                         | 15661.91                 |
| 8.45                     | 0.05                | -24.76                   | 507.62                  | 31.42                         | 16201.97                 |
| 8.74                     | 0.05                | -32.89                   | 498.28                  | 27.99                         | 16742.04                 |
| 9.02                     | 0.04                | -40.54                   | 488.95                  | 24.64                         | 17282.10                 |
| 9.30                     | 0.03                | -46.79                   | 475.69                  | 21.40                         | 17822.17                 |
| 9.58                     | 0.03                | -52.60                   | 462.45                  | 18.29                         | 18362.24                 |
| 9.86                     | 0.02                | -57.12                   | 446.29                  | 15.32                         | 18902.30                 |
| 10.15                    | 0.02                | -61.24                   | 430.14                  | 12.51                         | 19442.37                 |
| 10.43                    | 0.01                | -64.20                   | 411.99                  | 9.87                          | 19982.43                 |
| 10.71                    | 0.01                | -66.80                   | 393.85                  | 7.39                          | 20522.50                 |
| 10.99                    | 0.01                | -68.39                   | 374.53                  | 5.10                          | 21062.56                 |
| 11.27                    | 0.00                | -69.67                   | 355.22                  | 3.00                          | 21602.63                 |
| 11.55                    | 0.00                | -70.11                   | 335.42                  | 1.08                          | 22142.70                 |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

| D=1.50m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 11.84                    | 0.00                | -70.28                   | 315.63                  | -0.66                         | 22682.76                 |
| 12.12                    | 0.00                | -69.76                   | 295.94                  | -2.21                         | 23222.83                 |
| 12.40                    | 0.00                | -69.05                   | 276.27                  | -3.22                         | 20921.05                 |
| 12.67                    | -0.01               | -68.05                   | 257.88                  | -3.76                         | 18472.86                 |
| 12.94                    | -0.01               | -66.98                   | 239.49                  | -4.55                         | 18866.52                 |
| 13.21                    | -0.01               | -65.61                   | 221.77                  | -5.21                         | 19260.18                 |
| 13.48                    | -0.01               | -64.16                   | 204.04                  | -5.76                         | 19653.84                 |
| 13.75                    | -0.01               | -62.52                   | 187.15                  | -6.20                         | 20047.50                 |
| 14.02                    | -0.01               | -60.82                   | 170.27                  | -6.53                         | 20441.16                 |
| 14.29                    | -0.01               | -59.00                   | 154.33                  | -6.76                         | 20834.82                 |
| 14.56                    | -0.01               | -57.17                   | 138.40                  | -6.89                         | 21228.48                 |
| 14.83                    | -0.01               | -55.29                   | 123.47                  | -6.94                         | 21622.14                 |
| 15.10                    | -0.01               | -52.73                   | 108.29                  | -13.88                        | 54080.41                 |
| 15.45                    | -0.01               | -46.18                   | 91.87                   | -20.55                        | 88142.00                 |
| 15.80                    | -0.01               | -39.03                   | 75.73                   | -20.06                        | 90138.74                 |
| 16.15                    | -0.01               | -32.14                   | 64.49                   | -19.56                        | 92135.48                 |
| 16.50                    | -0.01               | -25.94                   | 53.47                   | -12.63                        | 61241.34                 |
| 16.82                    | -0.01               | -23.42                   | 46.24                   | -6.10                         | 28897.45                 |
| 17.14                    | -0.01               | -21.50                   | 38.79                   | -5.87                         | 29444.17                 |
| 17.45                    | -0.01               | -19.70                   | 32.53                   | -5.60                         | 29990.89                 |
| 17.77                    | -0.01               | -17.94                   | 26.27                   | -5.30                         | 30537.62                 |
| 18.09                    | -0.01               | -16.33                   | 21.09                   | -4.98                         | 31084.34                 |
| 18.41                    | 0.00                | -14.77                   | 15.90                   | -4.64                         | 31631.06                 |
| 18.73                    | 0.00                | -13.38                   | 11.65                   | -4.28                         | 32177.79                 |
| 19.05                    | 0.00                | -12.04                   | 7.41                    | -3.91                         | 32724.51                 |
| 19.36                    | 0.00                | -10.88                   | 3.95                    | -3.54                         | 33271.23                 |
| 19.68                    | 0.00                | -9.79                    | 0.50                    | -3.17                         | 33817.96                 |
| 20.00                    | 0.00                | -8.87                    | -2.31                   | -2.80                         | 34364.68                 |
| 20.32                    | 0.00                | -8.01                    | -5.13                   | -2.42                         | 34911.40                 |
| 20.64                    | 0.00                | -7.32                    | -7.45                   | -2.06                         | 35458.12                 |
| 20.95                    | 0.00                | -6.35                    | -9.85                   | -4.95                         | 112298.75                |
| 21.30                    | 0.00                | -4.19                    | -11.37                  | -6.43                         | 188592.66                |
| 21.65                    | 0.00                | -2.10                    | -12.78                  | -4.90                         | 188592.66                |
| 22.00                    | 0.00                | -0.73                    | -13.00                  | -3.66                         | 188592.66                |
| 22.34                    | 0.00                | 0.44                     | -13.22                  | -2.62                         | 188592.66                |
| 22.69                    | 0.00                | 1.12                     | -12.80                  | -1.79                         | 188592.66                |
| 23.04                    | 0.00                | 1.68                     | -12.40                  | -1.10                         | 188592.66                |
| 23.39                    | 0.00                | 1.91                     | -11.71                  | -0.57                         | 188592.66                |
| 23.73                    | 0.00                | 2.47                     | -11.06                  | -8.62                         | 4637806.41               |
| 23.87                    | 0.00                | 3.95                     | -10.53                  | -10.35                        | 16250826.68              |
| 24.01                    | 0.00                | 5.01                     | -9.95                   | -1.41                         | 18044085.85              |
| 24.15                    | 0.00                | 4.66                     | -9.26                   | 3.04                          | 19837345.01              |
| 24.29                    | 0.00                | 4.13                     | -8.61                   | 4.08                          | 11867085.12              |

Trabajo: 2-1259

Proyecto: CAVAROSA

Ciente: SFERA PROPERTIES CORP



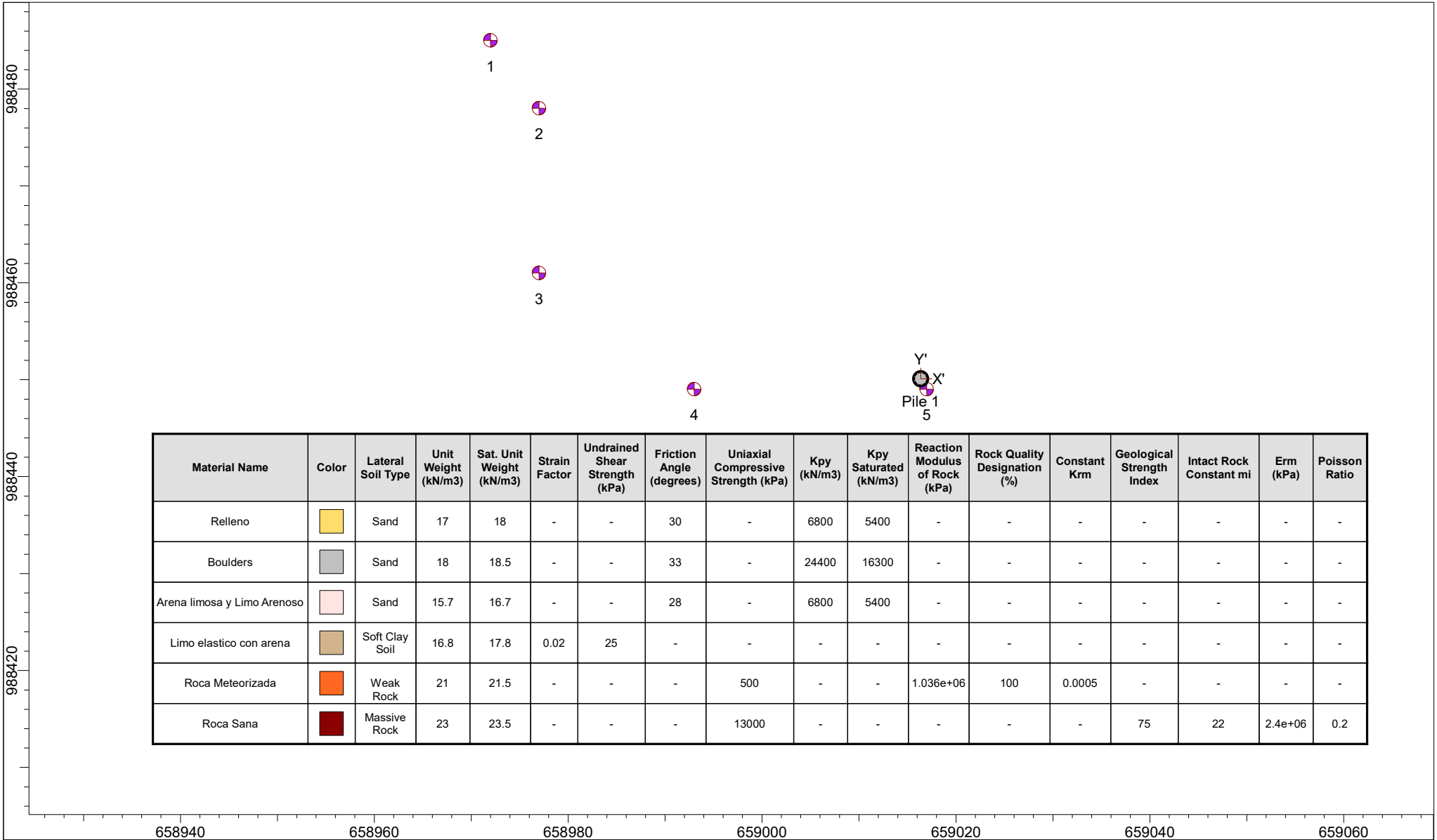
**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

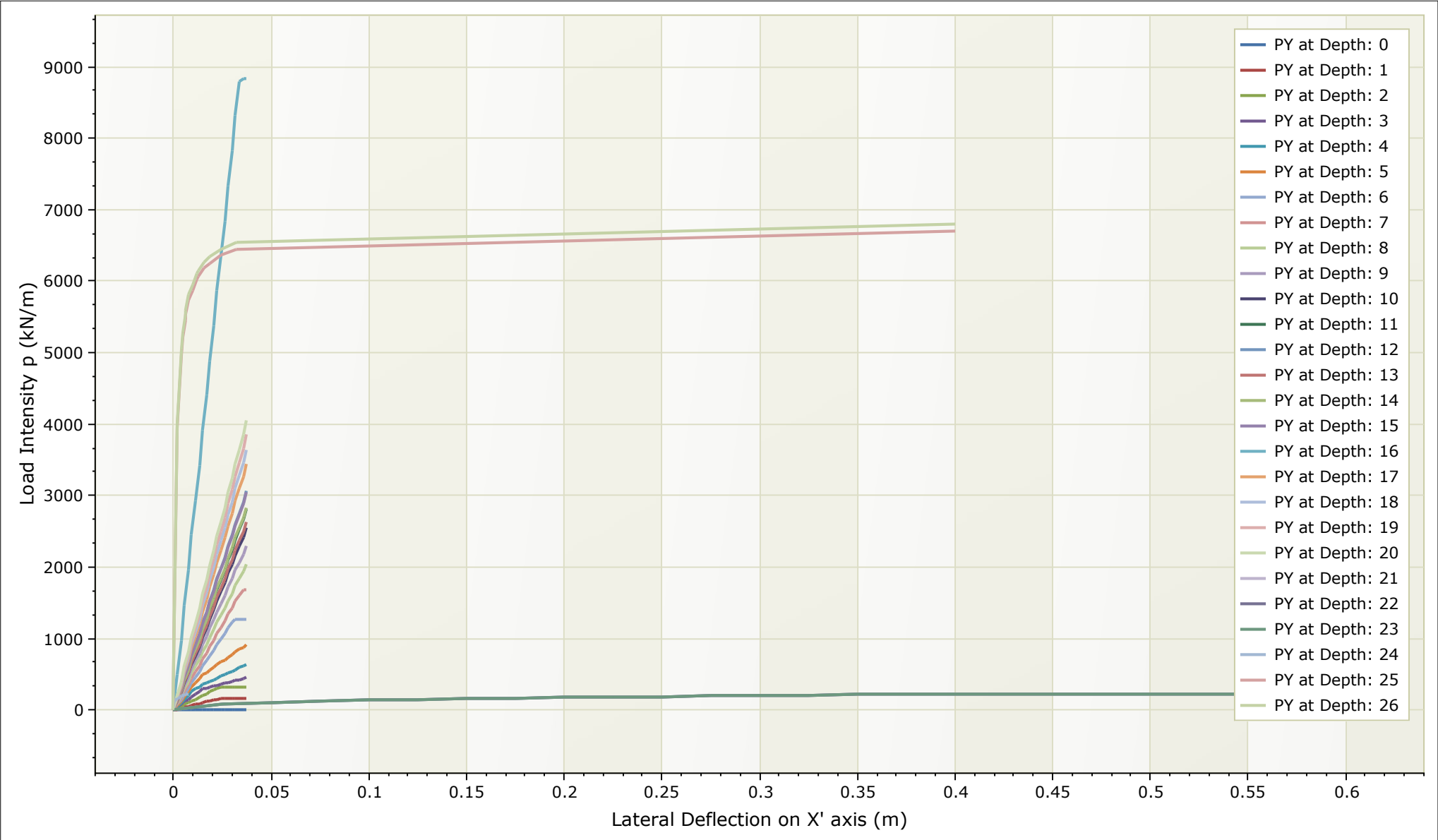
| D=1.50m                  |                     |                          |                         |                               |                          |
|--------------------------|---------------------|--------------------------|-------------------------|-------------------------------|--------------------------|
| Depth From Pile Head (m) | Displacement X (cm) | Beam Shear Force X' (kN) | Beam Moment X'Z' (kN·m) | Soil Reaction Force X' (kN/m) | Soil Stiffness X' (kN/m) |
| 24.59                    | 0.00                | 3.71                     | -7.51                   | 0.97                          | 2103647.94               |
| 24.88                    | 0.00                | 3.40                     | -6.42                   | 1.17                          | 2103782.82               |
| 25.17                    | 0.00                | 3.04                     | -5.52                   | 1.25                          | 2103915.94               |
| 25.47                    | 0.00                | 2.68                     | -4.63                   | 1.15                          | 2104047.29               |
| 25.76                    | 0.00                | 2.36                     | -3.94                   | 1.08                          | 2104176.99               |
| 26.06                    | 0.00                | 2.06                     | -3.25                   | 0.92                          | 2104304.95               |
| 26.35                    | 0.00                | 1.81                     | -2.72                   | 0.82                          | 2104431.32               |
| 26.65                    | 0.00                | 1.58                     | -2.19                   | 0.67                          | 2104556.05               |
| 26.94                    | 0.00                | 1.40                     | -1.78                   | 0.59                          | 2104679.25               |
| 27.23                    | 0.00                | 1.24                     | -1.36                   | 0.49                          | 2104800.92               |
| 27.53                    | 0.00                | 1.10                     | -1.04                   | 0.46                          | 2104921.09               |
| 27.82                    | 0.00                | 0.97                     | -0.71                   | 0.44                          | 2105039.76               |
| 28.12                    | 0.00                | 0.83                     | -0.47                   | 0.52                          | 2105157.03               |
| 28.41                    | 0.00                | 0.68                     | -0.22                   | 0.67                          | 2105272.86               |
| 28.71                    | 0.00                | 0.40                     | -0.09                   | 1.06                          | 2105387.36               |
| 29.00                    | 0.00                | 0.17                     | 0.02                    | 1.66                          | 1052746.66               |



**APENDICE F**  
**CURVAS - PY**



|                                                                                                                                                                                         |                      |                     |                   |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------|----------------|
|  <div>TECNILAB, S. A.<br/>LABORATORIO DE SUELOS Y MATERIALES<br/>FUNDAÇÃO<br/>A<br/>EN<br/>1973</div> | Project              |                     | PROYECTO CAVAROSA |                |
|                                                                                                                                                                                         | Analysis Description |                     | Curvas - PY       |                |
|                                                                                                                                                                                         | Drawn By             | A. Andrew           | Company           | Tecnilab, S.A. |
|                                                                                                                                                                                         | Date                 | 22/3/2024, 09:12:59 | Tipo de Pilote    |                |



|                                                                                                                                                                                                           |                               |                |                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------|----------------|
| <div><div><div>TECNILAB, S. A.</div><div>LABORATORIO DE SUELOS Y MATERIALES</div><div>FUNDADA EN 1973</div></div></div> | ProjectPROYECTO CAVAROSA      |                |                |
|                                                                                                                                                                                                           | Analysis DescriptionCurvas PY |                |                |
|                                                                                                                                                                                                           | Drawn ByA. Andrew             | Company        | Tecnilab, S.A. |
|                                                                                                                                                                                                           | Date22/3/2024, 09:12:59       | Tipo de Pilote | D=1.00m        |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.00m        |                            |                |                            |                |                            |                |                            |                |                            |                |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|
| PY at Depth: 0 | Load Intensity<br>p (kN/m) | PY at Depth: 1 | Load Intensity<br>p (kN/m) | PY at Depth: 2 | Load Intensity<br>p (kN/m) | PY at Depth: 3 | Load Intensity<br>p (kN/m) | PY at Depth: 4 | Load Intensity<br>p (kN/m) | PY at Depth: 5 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     |
| 0.0019         | 0.0000                     | 0.0019         | 12.7498                    | 0.0019         | 25.5001                    | 0.0019         | 38.2505                    | 0.0019         | 50.9994                    | 0.0019         | 63.7499                    |
| 0.0038         | 0.0000                     | 0.0038         | 25.4996                    | 0.0038         | 50.9992                    | 0.0038         | 76.5003                    | 0.0038         | 102.0007                   | 0.0038         | 127.4977                   |
| 0.0056         | 0.0000                     | 0.0056         | 38.2487                    | 0.0056         | 76.4994                    | 0.0056         | 114.7508                   | 0.0056         | 152.9965                   | 0.0056         | 191.2542                   |
| 0.0075         | 0.0000                     | 0.0075         | 50.9982                    | 0.0075         | 101.9982                   | 0.0075         | 153.0036                   | 0.0075         | 204.0014                   | 0.0075         | 255.0008                   |
| 0.0094         | 0.0000                     | 0.0094         | 63.7480                    | 0.0094         | 127.4977                   | 0.0094         | 191.2489                   | 0.0094         | 254.9980                   | 0.0094         | 318.7519                   |
| 0.0113         | 0.0000                     | 0.0113         | 76.4977                    | 0.0113         | 152.9959                   | 0.0113         | 229.5016                   | 0.0113         | 300.7933                   | 0.0113         | 382.4985                   |
| 0.0131         | 0.0000                     | 0.0131         | 89.2475                    | 0.0131         | 178.4982                   | 0.0131         | 267.7544                   | 0.0131         | 328.8068                   | 0.0131         | 445.1126                   |
| 0.0150         | 0.0000                     | 0.0150         | 101.9952                   | 0.0150         | 204.0006                   | 0.0150         | 293.1239                   | 0.0150         | 354.0095                   | 0.0150         | 489.6299                   |
| 0.0169         | 0.0000                     | 0.0169         | 114.7464                   | 0.0169         | 229.4988                   | 0.0169         | 307.0895                   | 0.0169         | 377.8387                   | 0.0169         | 525.7787                   |
| 0.0188         | 0.0000                     | 0.0188         | 127.4979                   | 0.0188         | 255.0012                   | 0.0188         | 320.6699                   | 0.0188         | 401.1879                   | 0.0188         | 561.2802                   |
| 0.0206         | 0.0000                     | 0.0206         | 140.2488                   | 0.0206         | 280.4994                   | 0.0206         | 334.2490                   | 0.0206         | 424.5287                   | 0.0206         | 596.7816                   |
| 0.0225         | 0.0000                     | 0.0225         | 152.9927                   | 0.0225         | 305.9959                   | 0.0225         | 347.8295                   | 0.0225         | 447.8795                   | 0.0225         | 632.2830                   |
| 0.0244         | 0.0000                     | 0.0244         | 164.2607                   | 0.0244         | 326.6590                   | 0.0244         | 361.4012                   | 0.0244         | 471.2202                   | 0.0244         | 667.7789                   |
| 0.0263         | 0.0000                     | 0.0263         | 164.2607                   | 0.0263         | 326.6590                   | 0.0263         | 374.9803                   | 0.0263         | 494.5694                   | 0.0263         | 703.2803                   |
| 0.0281         | 0.0000                     | 0.0281         | 164.2607                   | 0.0281         | 326.6590                   | 0.0281         | 388.5608                   | 0.0281         | 517.9186                   | 0.0281         | 738.7818                   |
| 0.0300         | 0.0000                     | 0.0300         | 164.2607                   | 0.0300         | 326.6590                   | 0.0300         | 402.1412                   | 0.0300         | 541.2610                   | 0.0300         | 774.2777                   |
| 0.0319         | 0.0000                     | 0.0319         | 164.2607                   | 0.0319         | 326.6590                   | 0.0319         | 415.7216                   | 0.0319         | 564.6102                   | 0.0319         | 809.7791                   |
| 0.0338         | 0.0000                     | 0.0338         | 164.2607                   | 0.0338         | 326.6590                   | 0.0338         | 429.2920                   | 0.0338         | 587.9510                   | 0.0338         | 845.2805                   |
| 0.0356         | 0.0000                     | 0.0356         | 164.2607                   | 0.0356         | 326.6590                   | 0.0356         | 442.8725                   | 0.0356         | 611.3001                   | 0.0356         | 880.7765                   |
| 0.0375         | 0.0000                     | 0.0375         | 164.2607                   | 0.0375         | 326.6590                   | 0.0375         | 456.4529                   | 0.0375         | 634.6509                   | 0.0375         | 916.2779                   |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



| D=1.00m        |                            |                |                            |                |                            |                |                            |                    |                            |                    |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth: 6 | Load Intensity<br>p (kN/m) | PY at Depth: 7 | Load Intensity<br>p (kN/m) | PY at Depth: 8 | Load Intensity<br>p (kN/m) | PY at Depth: 9 | Load Intensity<br>p (kN/m) | PY at Depth:<br>10 | Load Intensity<br>p (kN/m) | PY at Depth:<br>11 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0019         | 76.5003                    | 0.0019         | 89.2501                    | 0.0019         | 102.0006                   | 0.0019         | 114.7513                   | 0.0019             | 127.5027                   | 0.0019             | 140.2550                   |
| 0.0038         | 153.0036                   | 0.0038         | 178.4983                   | 0.0038         | 203.9998                   | 0.0038         | 229.4988                   | 0.0038             | 254.9973                   | 0.0038             | 280.5020                   |
| 0.0056         | 229.5016                   | 0.0056         | 267.7473                   | 0.0056         | 306.0030                   | 0.0056         | 344.2501                   | 0.0056             | 382.5000                   | 0.0056             | 420.7551                   |
| 0.0075         | 305.9997                   | 0.0075         | 356.9966                   | 0.0075         | 407.9961                   | 0.0075         | 459.0014                   | 0.0075             | 510.0036                   | 0.0075             | 561.0020                   |
| 0.0094         | 382.5052                   | 0.0094         | 446.2456                   | 0.0094         | 509.9960                   | 0.0094         | 573.7489                   | 0.0094             | 637.5063                   | 0.0094             | 701.2570                   |
| 0.0113         | 459.0033                   | 0.0113         | 535.5043                   | 0.0113         | 611.9959                   | 0.0113         | 688.5002                   | 0.0113             | 765.0009                   | 0.0113             | 841.5040                   |
| 0.0131         | 535.5013                   | 0.0131         | 624.7536                   | 0.0131         | 713.9958                   | 0.0131         | 803.2515                   | 0.0131             | 892.5036                   | 0.0131             | 981.7590                   |
| 0.0150         | 611.9994                   | 0.0150         | 714.0026                   | 0.0150         | 815.9957                   | 0.0150         | 917.9990                   | 0.0150             | 1019.9672                  | 0.0150             | 1121.9840                  |
| 0.0169         | 688.5049                   | 0.0169         | 803.2519                   | 0.0169         | 917.9989                   | 0.0169         | 1032.7587                  | 0.0169             | 1147.4970                  | 0.0169             | 1262.2268                  |
| 0.0188         | 765.0030                   | 0.0188         | 892.5009                   | 0.0188         | 1020.0056                  | 0.0188         | 1147.5132                  | 0.0188             | 1275.0268                  | 0.0188             | 1402.5502                  |
| 0.0206         | 841.5010                   | 0.0206         | 981.7499                   | 0.0206         | 1122.0019                  | 0.0206         | 1262.2291                  | 0.0206             | 1402.4662                  | 0.0206             | 1542.7929                  |
| 0.0225         | 918.0065                   | 0.0225         | 1070.9705                  | 0.0225         | 1224.0047                  | 0.0225         | 1376.9836                  | 0.0225             | 1530.0057                  | 0.0225             | 1683.0164                  |
| 0.0244         | 994.5175                   | 0.0244         | 1160.2575                  | 0.0244         | 1325.9753                  | 0.0244         | 1491.7608                  | 0.0244             | 1657.5355                  | 0.0244             | 1823.2591                  |
| 0.0263         | 1071.0175                  | 0.0263         | 1249.5446                  | 0.0263         | 1427.9781                  | 0.0263         | 1606.5153                  | 0.0263             | 1784.9749                  | 0.0263             | 1963.5019                  |
| 0.0281         | 1147.4953                  | 0.0281         | 1338.7381                  | 0.0281         | 1529.9809                  | 0.0281         | 1721.2312                  | 0.0281             | 1912.5047                  | 0.0281             | 2103.7446                  |
| 0.0300         | 1223.9988                  | 0.0300         | 1428.0251                  | 0.0300         | 1631.9515                  | 0.0300         | 1835.9857                  | 0.0300             | 2040.0344                  | 0.0300             | 2243.9874                  |
| 0.0319         | 1268.6033                  | 0.0319         | 1517.2154                  | 0.0319         | 1733.9543                  | 0.0319         | 1950.7403                  | 0.0319             | 2167.4739                  | 0.0319             | 2384.2914                  |
| 0.0338         | 1269.3261                  | 0.0338         | 1606.5025                  | 0.0338         | 1836.0249                  | 0.0338         | 2065.5174                  | 0.0338             | 2295.0037                  | 0.0338             | 2524.5342                  |
| 0.0356         | 1269.3261                  | 0.0356         | 1680.6341                  | 0.0356         | 1938.0277                  | 0.0356         | 2180.2719                  | 0.0356             | 2422.5334                  | 0.0356             | 2664.7770                  |
| 0.0375         | 1269.3261                  | 0.0375         | 1680.6341                  | 0.0375         | 2039.9982                  | 0.0375         | 2294.9878                  | 0.0375             | 2549.9729                  | 0.0375             | 2805.0197                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.00m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>12 | Load Intensity<br>p (kN/m) | PY at Depth:<br>13 | Load Intensity<br>p (kN/m) | PY at Depth:<br>14 | Load Intensity<br>p (kN/m) | PY at Depth:<br>15 | Load Intensity<br>p (kN/m) | PY at Depth:<br>16 | Load Intensity<br>p (kN/m) | PY at Depth:<br>17 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0019             | 153.0024                   | 0.0019             | 131.6267                   | 0.0019             | 141.7478                   | 0.0019             | 151.8752                   | 0.0019             | 488.9986                   | 0.0019             | 172.1239                   |
| 0.0038             | 306.0051                   | 0.0038             | 263.2456                   | 0.0038             | 283.4956                   | 0.0038             | 303.7478                   | 0.0038             | 977.9986                   | 0.0038             | 344.2477                   |
| 0.0056             | 459.0075                   | 0.0056             | 394.8722                   | 0.0056             | 425.2526                   | 0.0056             | 455.6230                   | 0.0056             | 1467.0429                  | 0.0056             | 516.3816                   |
| 0.0075             | 612.0050                   | 0.0075             | 526.4989                   | 0.0075             | 566.9996                   | 0.0075             | 607.4981                   | 0.0075             | 1955.9571                  | 0.0075             | 688.5055                   |
| 0.0094             | 765.0126                   | 0.0094             | 658.1278                   | 0.0094             | 708.7474                   | 0.0094             | 759.3770                   | 0.0094             | 2444.9714                  | 0.0094             | 860.6294                   |
| 0.0113             | 918.0149                   | 0.0113             | 789.7467                   | 0.0113             | 850.4952                   | 0.0113             | 911.2459                   | 0.0113             | 2933.9857                  | 0.0113             | 1032.7473                  |
| 0.0131             | 1071.0015                  | 0.0131             | 921.3733                   | 0.0131             | 992.2522                   | 0.0131             | 1063.1259                  | 0.0131             | 3423.0000                  | 0.0131             | 1204.8753                  |
| 0.0150             | 1224.0100                  | 0.0150             | 1052.9667                  | 0.0150             | 1133.9778                  | 0.0150             | 1214.9889                  | 0.0150             | 3912.0143                  | 0.0150             | 1377.0032                  |
| 0.0169             | 1377.0186                  | 0.0169             | 1184.6667                  | 0.0169             | 1275.7778                  | 0.0169             | 1366.8889                  | 0.0169             | 4401.0286                  | 0.0169             | 1549.1108                  |
| 0.0188             | 1530.0238                  | 0.0188             | 1316.2667                  | 0.0188             | 1417.4778                  | 0.0188             | 1518.7519                  | 0.0188             | 4889.9857                  | 0.0188             | 1721.2387                  |
| 0.0206             | 1683.0323                  | 0.0206             | 1447.8889                  | 0.0206             | 1559.2704                  | 0.0206             | 1670.6519                  | 0.0206             | 5379.0000                  | 0.0206             | 1893.3667                  |
| 0.0225             | 1836.0409                  | 0.0225             | 1579.4889                  | 0.0225             | 1700.9704                  | 0.0225             | 1822.4519                  | 0.0225             | 5867.9714                  | 0.0225             | 2065.4946                  |
| 0.0244             | 1988.9978                  | 0.0244             | 1711.1111                  | 0.0244             | 1842.7630                  | 0.0244             | 1974.3519                  | 0.0244             | 6356.9857                  | 0.0244             | 2237.6226                  |
| 0.0263             | 2142.0546                  | 0.0263             | 1842.7111                  | 0.0263             | 1984.4704                  | 0.0263             | 2126.2519                  | 0.0263             | 6846.0000                  | 0.0263             | 2409.7505                  |
| 0.0281             | 2295.0115                  | 0.0281             | 1974.4111                  | 0.0281             | 2126.2630                  | 0.0281             | 2278.1148                  | 0.0281             | 7335.0143                  | 0.0281             | 2581.8581                  |
| 0.0300             | 2448.0201                  | 0.0300             | 2106.0111                  | 0.0300             | 2267.9630                  | 0.0300             | 2430.0148                  | 0.0300             | 7824.0286                  | 0.0300             | 2753.9860                  |
| 0.0319             | 2601.0286                  | 0.0319             | 2237.6333                  | 0.0319             | 2409.7556                  | 0.0319             | 2581.8778                  | 0.0319             | 8312.9857                  | 0.0319             | 2926.1140                  |
| 0.0338             | 2754.0338                  | 0.0338             | 2369.2333                  | 0.0338             | 2551.4556                  | 0.0338             | 2733.7778                  | 0.0338             | 8802.0000                  | 0.0338             | 3098.2419                  |
| 0.0356             | 2907.0424                  | 0.0356             | 2500.8556                  | 0.0356             | 2693.2556                  | 0.0356             | 2885.6407                  | 0.0356             | 8839.4286                  | 0.0356             | 3270.3699                  |
| 0.0375             | 3060.0509                  | 0.0375             | 2632.4556                  | 0.0375             | 2834.9556                  | 0.0375             | 3037.4778                  | 0.0375             | 8839.4286                  | 0.0375             | 3442.4774                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.00m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>18 | Load Intensity<br>p (kN/m) | PY at Depth:<br>19 | Load Intensity<br>p (kN/m) | PY at Depth:<br>20 | Load Intensity<br>p (kN/m) | PY at Depth:<br>21 | Load Intensity<br>p (kN/m) | PY at Depth:<br>22 | Load Intensity<br>p (kN/m) | PY at Depth:<br>23 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0019             | 182.2516                   | 0.0019             | 192.3791                   | 0.0019             | 202.5027                   | 0.0250             | 89.2900                    | 0.0250             | 89.2900                    | 0.0250             | 89.2900                    |
| 0.0038             | 364.5032                   | 0.0038             | 384.7583                   | 0.0038             | 405.0055                   | 0.0500             | 112.5000                   | 0.0500             | 112.5000                   | 0.0500             | 112.5000                   |
| 0.0056             | 546.7548                   | 0.0056             | 577.1374                   | 0.0056             | 607.4982                   | 0.0750             | 128.8000                   | 0.0750             | 128.8000                   | 0.0750             | 128.8000                   |
| 0.0075             | 729.0065                   | 0.0075             | 769.5165                   | 0.0075             | 810.0009                   | 0.1000             | 141.7000                   | 0.1000             | 141.7000                   | 0.1000             | 141.7000                   |
| 0.0094             | 911.2581                   | 0.0094             | 961.8957                   | 0.0094             | 1012.5137                  | 0.1250             | 152.7000                   | 0.1250             | 152.7000                   | 0.1250             | 152.7000                   |
| 0.0113             | 1093.5419                  | 0.0113             | 1154.2353                  | 0.0113             | 1215.0050                  | 0.1500             | 162.3000                   | 0.1500             | 162.3000                   | 0.1500             | 162.3000                   |
| 0.0131             | 1275.7645                  | 0.0131             | 1346.6727                  | 0.0131             | 1417.4964                  | 0.1750             | 170.8000                   | 0.1750             | 170.8000                   | 0.1750             | 170.8000                   |
| 0.0150             | 1458.0097                  | 0.0150             | 1539.0144                  | 0.0150             | 1619.9878                  | 0.2000             | 178.6000                   | 0.2000             | 178.6000                   | 0.2000             | 178.6000                   |
| 0.0169             | 1640.2323                  | 0.0169             | 1731.4518                  | 0.0169             | 1822.5360                  | 0.2250             | 185.7000                   | 0.2250             | 185.7000                   | 0.2250             | 185.7000                   |
| 0.0188             | 1822.5161                  | 0.0188             | 1923.7914                  | 0.0188             | 2025.0273                  | 0.2500             | 192.4000                   | 0.2500             | 192.4000                   | 0.2500             | 192.4000                   |
| 0.0206             | 2004.8000                  | 0.0206             | 2116.1309                  | 0.0206             | 2227.5187                  | 0.2750             | 198.6000                   | 0.2750             | 198.6000                   | 0.2750             | 198.6000                   |
| 0.0225             | 2187.0226                  | 0.0225             | 2308.5683                  | 0.0225             | 2430.0101                  | 0.3000             | 204.4000                   | 0.3000             | 204.4000                   | 0.3000             | 204.4000                   |
| 0.0244             | 2369.2677                  | 0.0244             | 2500.9101                  | 0.0244             | 2632.5014                  | 0.3250             | 210.0000                   | 0.3250             | 210.0000                   | 0.3250             | 210.0000                   |
| 0.0263             | 2551.4903                  | 0.0263             | 2693.2496                  | 0.0263             | 2834.9928                  | 0.3500             | 215.2000                   | 0.3500             | 215.2000                   | 0.3500             | 215.2000                   |
| 0.0281             | 2733.7742                  | 0.0281             | 2885.6871                  | 0.0281             | 3037.5410                  | 0.3750             | 220.2000                   | 0.3750             | 220.2000                   | 0.3750             | 220.2000                   |
| 0.0300             | 2916.0581                  | 0.0300             | 3078.0266                  | 0.0300             | 3240.0324                  | 0.4000             | 225.0000                   | 0.4000             | 225.0000                   | 0.4000             | 225.0000                   |
| 0.0319             | 3098.2806                  | 0.0319             | 3270.4640                  | 0.0319             | 3442.5237                  | 0.6000             | 225.0000                   | 0.6000             | 225.0000                   | 0.6000             | 225.0000                   |
| 0.0338             | 3280.5258                  | 0.0338             | 3462.8058                  | 0.0338             | 3645.0151                  |                    |                            |                    |                            |                    |                            |
| 0.0356             | 3462.8097                  | 0.0356             | 3655.1453                  | 0.0356             | 3847.5065                  |                    |                            |                    |                            |                    |                            |
| 0.0375             | 3645.0323                  | 0.0375             | 3847.5827                  | 0.0375             | 4050.0547                  |                    |                            |                    |                            |                    |                            |

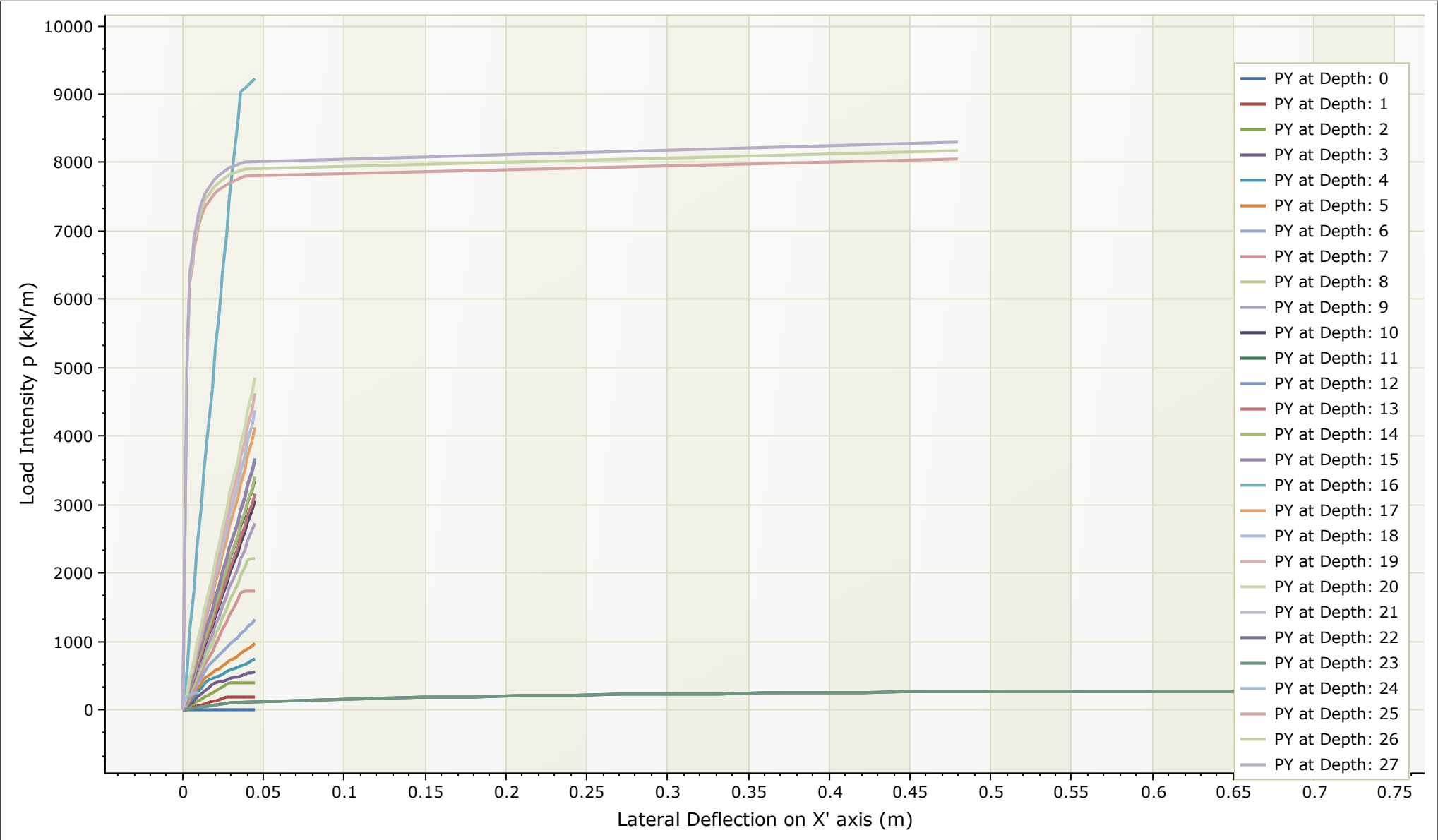
Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



**TECNILAB, S. A.**  
 UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
 LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
 EN  
 1973

| D=1.00m            |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>24 | Load Intensity<br>p (kN/m) | PY at Depth:<br>25 | Load Intensity<br>p (kN/m) | PY at Depth:<br>26 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0005             | 114.6149                   | 0.0020             | 3965.2963                  | 0.0020             | 3999.9630                  |
| 0.0010             | 135.1054                   | 0.0040             | 4990.4444                  | 0.0040             | 5045.4444                  |
| 0.0015             | 150.3866                   | 0.0048             | 5215.0741                  | 0.0048             | 5275.7407                  |
| 0.0020             | 161.6107                   | 0.0060             | 5461.3333                  | 0.0060             | 5527.3333                  |
| 0.0025             | 171.3625                   | 0.0064             | 5525.9630                  | 0.0064             | 5594.3333                  |
| 0.0030             | 179.2821                   | 0.0080             | 5731.5926                  | 0.0080             | 5803.9259                  |
| 0.0035             | 186.3848                   | 0.0096             | 5876.8519                  | 0.0096             | 5953.2222                  |
| 0.0040             | 192.9429                   | 0.0120             | 6029.8519                  | 0.0120             | 6110.5185                  |
| 0.0045             | 198.5723                   | 0.0128             | 6069.4815                  | 0.0128             | 6151.5185                  |
| 0.0050             | 203.9304                   | 0.0160             | 6191.1111                  | 0.0160             | 6275.8148                  |
| 0.0055             | 208.8813                   | 0.0184             | 6256.1111                  | 0.0184             | 6343.1111                  |
| 0.0060             | 213.4357                   | 0.0240             | 6360.7407                  | 0.0240             | 6451.1111                  |
| 0.0065             | 217.8170                   | 0.0240             | 6360.7407                  | 0.0240             | 6451.1111                  |
| 0.0070             | 221.9018                   | 0.0320             | 6449.3704                  | 0.0320             | 6542.4074                  |
| 0.0075             | 225.7616                   | 0.0320             | 6449.3704                  | 0.0320             | 6542.4074                  |
|                    |                            | 0.4000             | 6707.0000                  | 0.4000             | 6807.0000                  |



**TECNILAB, S. A.**  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
A  
EN  
1973

Project

PROYECTO CAVAROSA

Analysis Description

Curvas PY

Drawn By

A. Andrew

Company

Tecnilab, S.A.

Date

22/3/2024, 09:12:59

Tipo de Pilote

D=1.20m

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.20m        |                            |                |                            |                |                            |                |                            |                |                            |                |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|
| PY at Depth: 0 | Load Intensity<br>p (kN/m) | PY at Depth: 1 | Load Intensity<br>p (kN/m) | PY at Depth: 2 | Load Intensity<br>p (kN/m) | PY at Depth: 3 | Load Intensity<br>p (kN/m) | PY at Depth: 4 | Load Intensity<br>p (kN/m) | PY at Depth: 5 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     |
| 0.0023         | 0.0000                     | 0.0023         | 15.2993                    | 0.0023         | 30.5996                    | 0.0023         | 45.9003                    | 0.0023         | 61.1996                    | 0.0023         | 76.5002                    |
| 0.0045         | 0.0000                     | 0.0045         | 30.5992                    | 0.0045         | 61.1998                    | 0.0045         | 91.8007                    | 0.0045         | 122.3989                   | 0.0045         | 153.0045                   |
| 0.0068         | 0.0000                     | 0.0068         | 45.8985                    | 0.0068         | 91.7989                    | 0.0068         | 137.6980                   | 0.0068         | 183.6025                   | 0.0068         | 229.4995                   |
| 0.0090         | 0.0000                     | 0.0090         | 61.1985                    | 0.0090         | 122.3984                   | 0.0090         | 183.5998                   | 0.0090         | 244.7977                   | 0.0090         | 305.9990                   |
| 0.0113         | 0.0000                     | 0.0113         | 76.4977                    | 0.0113         | 152.9959                   | 0.0113         | 229.5016                   | 0.0113         | 306.0013                   | 0.0113         | 382.4985                   |
| 0.0135         | 0.0000                     | 0.0135         | 91.7970                    | 0.0135         | 183.5976                   | 0.0135         | 275.4034                   | 0.0135         | 367.1982                   | 0.0135         | 454.9709                   |
| 0.0158         | 0.0000                     | 0.0158         | 107.0956                   | 0.0158         | 214.1950                   | 0.0158         | 321.2978                   | 0.0158         | 428.4018                   | 0.0158         | 497.3937                   |
| 0.0180         | 0.0000                     | 0.0180         | 122.3970                   | 0.0180         | 244.7967                   | 0.0180         | 367.1996                   | 0.0180         | 457.4966                   | 0.0180         | 536.4841                   |
| 0.0203         | 0.0000                     | 0.0203         | 137.6992                   | 0.0203         | 275.3942                   | 0.0203         | 394.1979                   | 0.0203         | 481.8126                   | 0.0203         | 573.5178                   |
| 0.0225         | 0.0000                     | 0.0225         | 152.9927                   | 0.0225         | 305.9959                   | 0.0225         | 409.4590                   | 0.0225         | 505.5082                   | 0.0225         | 609.8186                   |
| 0.0248         | 0.0000                     | 0.0248         | 168.2932                   | 0.0248         | 336.5934                   | 0.0248         | 424.7200                   | 0.0248         | 529.1939                   | 0.0248         | 646.1194                   |
| 0.0270         | 0.0000                     | 0.0270         | 183.5966                   | 0.0270         | 367.2009                   | 0.0270         | 439.9724                   | 0.0270         | 552.8879                   | 0.0270         | 682.4201                   |
| 0.0293         | 0.0000                     | 0.0293         | 194.0854                   | 0.0293         | 397.3288                   | 0.0293         | 455.2334                   | 0.0293         | 576.5735                   | 0.0293         | 718.7209                   |
| 0.0315         | 0.0000                     | 0.0315         | 194.0854                   | 0.0315         | 397.4101                   | 0.0315         | 470.4945                   | 0.0315         | 600.2675                   | 0.0315         | 755.0217                   |
| 0.0338         | 0.0000                     | 0.0338         | 194.0854                   | 0.0338         | 397.4101                   | 0.0338         | 485.7468                   | 0.0338         | 623.9615                   | 0.0338         | 791.3225                   |
| 0.0360         | 0.0000                     | 0.0360         | 194.0854                   | 0.0360         | 397.4101                   | 0.0360         | 501.0079                   | 0.0360         | 647.6472                   | 0.0360         | 827.6232                   |
| 0.0383         | 0.0000                     | 0.0383         | 194.0854                   | 0.0383         | 397.4101                   | 0.0383         | 516.2689                   | 0.0383         | 671.3428                   | 0.0383         | 863.9240                   |
| 0.0405         | 0.0000                     | 0.0405         | 194.0854                   | 0.0405         | 397.4101                   | 0.0405         | 531.5226                   | 0.0405         | 695.0284                   | 0.0405         | 900.2248                   |
| 0.0428         | 0.0000                     | 0.0428         | 194.0854                   | 0.0428         | 397.4101                   | 0.0428         | 546.7836                   | 0.0428         | 718.7224                   | 0.0428         | 936.5256                   |
| 0.0450         | 0.0000                     | 0.0450         | 194.0854                   | 0.0450         | 397.4101                   | 0.0450         | 562.0447                   | 0.0450         | 742.4165                   | 0.0450         | 972.8483                   |

Trabajo: 2-1259

Proyecto: CAVAROSA

Cliente: SFERA PROPERTIES CORP



| D=1.20m        |                            |                |                            |                |                            |                |                            |                    |                            |                    |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth: 6 | Load Intensity<br>p (kN/m) | PY at Depth: 7 | Load Intensity<br>p (kN/m) | PY at Depth: 8 | Load Intensity<br>p (kN/m) | PY at Depth: 9 | Load Intensity<br>p (kN/m) | PY at Depth:<br>10 | Load Intensity<br>p (kN/m) | PY at Depth:<br>11 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0023         | 91.8007                    | 0.0023         | 107.0970                   | 0.0023         | 122.4005                   | 0.0023         | 137.6984                   | 0.0023             | 153.0006                   | 0.0023             | 168.3016                   |
| 0.0045         | 183.5998                   | 0.0045         | 214.2038                   | 0.0045         | 244.7977                   | 0.0045         | 275.4029                   | 0.0045             | 306.0002                   | 0.0045             | 336.6052                   |
| 0.0068         | 275.4034                   | 0.0068         | 321.3008                   | 0.0068         | 367.1982                   | 0.0068         | 413.0974                   | 0.0068             | 459.0007                   | 0.0068             | 504.8988                   |
| 0.0090         | 367.1996                   | 0.0090         | 428.3975                   | 0.0090         | 489.5954                   | 0.0090         | 550.7957                   | 0.0090             | 612.0003                   | 0.0090             | 673.2023                   |
| 0.0113         | 459.0033                   | 0.0113         | 535.5043                   | 0.0113         | 611.9959                   | 0.0113         | 688.5002                   | 0.0113             | 765.0009                   | 0.0113             | 841.5040                   |
| 0.0135         | 550.7995                   | 0.0135         | 642.6013                   | 0.0135         | 734.3964                   | 0.0135         | 826.1986                   | 0.0135             | 918.0095                   | 0.0135             | 1009.8137                  |
| 0.0158         | 642.6031                   | 0.0158         | 749.6984                   | 0.0158         | 856.7936                   | 0.0158         | 963.8931                   | 0.0158             | 1071.0030                  | 0.0158             | 1178.1134                  |
| 0.0180         | 703.9091                   | 0.0180         | 856.7954                   | 0.0180         | 979.1941                   | 0.0180         | 1101.5714                  | 0.0180             | 1224.0007                  | 0.0180             | 1346.4208                  |
| 0.0203         | 755.9840                   | 0.0203         | 963.9021                   | 0.0203         | 1101.6278                  | 0.0203         | 1239.2969                  | 0.0203             | 1376.9983                  | 0.0203             | 1514.7283                  |
| 0.0225         | 807.1208                   | 0.0225         | 1070.9705                  | 0.0225         | 1224.0047                  | 0.0225         | 1376.9836                  | 0.0225             | 1530.0057                  | 0.0225             | 1683.0164                  |
| 0.0248         | 858.2503                   | 0.0248         | 1178.1349                  | 0.0248         | 1346.3817                  | 0.0248         | 1514.6704                  | 0.0248             | 1683.0033                  | 0.0248             | 1851.3238                  |
| 0.0270         | 909.3871                   | 0.0270         | 1285.2026                  | 0.0270         | 1468.8263                  | 0.0270         | 1652.3571                  | 0.0270             | 1836.0010                  | 0.0270             | 2019.6312                  |
| 0.0293         | 960.5136                   | 0.0293         | 1392.2703                  | 0.0293         | 1591.2033                  | 0.0293         | 1790.0826                  | 0.0293             | 1988.9987                  | 0.0293             | 2187.9387                  |
| 0.0315         | 1011.6608                  | 0.0315         | 1499.4348                  | 0.0315         | 1713.5802                  | 0.0315         | 1927.7694                  | 0.0315             | 2142.0060                  | 0.0315             | 2356.2268                  |
| 0.0338         | 1062.8080                  | 0.0338         | 1606.5025                  | 0.0338         | 1836.0249                  | 0.0338         | 2065.5174                  | 0.0338             | 2295.0037                  | 0.0338             | 2524.5342                  |
| 0.0360         | 1113.8923                  | 0.0360         | 1712.6602                  | 0.0360         | 1958.4018                  | 0.0360         | 2203.2042                  | 0.0360             | 2448.0013                  | 0.0360             | 2692.8416                  |
| 0.0383         | 1165.0766                  | 0.0383         | 1736.5631                  | 0.0383         | 2080.7787                  | 0.0383         | 2340.9296                  | 0.0383             | 2600.9990                  | 0.0383             | 2861.1491                  |
| 0.0405         | 1216.1608                  | 0.0405         | 1736.5631                  | 0.0405         | 2193.1842                  | 0.0405         | 2478.6164                  | 0.0405             | 2754.0064                  | 0.0405             | 3029.4372                  |
| 0.0428         | 1267.3451                  | 0.0428         | 1736.5631                  | 0.0428         | 2213.7741                  | 0.0428         | 2616.3031                  | 0.0428             | 2907.0040                  | 0.0428             | 3197.7446                  |
| 0.0450         | 1318.4552                  | 0.0450         | 1736.5631                  | 0.0450         | 2213.7741                  | 0.0450         | 2733.7387                  | 0.0450             | 3060.0017                  | 0.0450             | 3366.0520                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.20m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>12 | Load Intensity<br>p (kN/m) | PY at Depth:<br>13 | Load Intensity<br>p (kN/m) | PY at Depth:<br>14 | Load Intensity<br>p (kN/m) | PY at Depth:<br>15 | Load Intensity<br>p (kN/m) | PY at Depth:<br>16 | Load Intensity<br>p (kN/m) | PY at Depth:<br>17 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0023             | 183.6041                   | 0.0023             | 157.9489                   | 0.0023             | 170.0970                   | 0.0023             | 182.2452                   | 0.0023             | 586.8076                   | 0.0023             | 206.5549                   |
| 0.0045             | 367.2030                   | 0.0045             | 315.8978                   | 0.0045             | 340.2033                   | 0.0045             | 364.5004                   | 0.0045             | 1173.5781                  | 0.0045             | 413.1098                   |
| 0.0068             | 550.8071                   | 0.0068             | 473.8467                   | 0.0068             | 510.3011                   | 0.0068             | 546.7456                   | 0.0068             | 1760.4601                  | 0.0068             | 619.6590                   |
| 0.0090             | 734.4109                   | 0.0090             | 631.7978                   | 0.0090             | 680.3981                   | 0.0090             | 729.0007                   | 0.0090             | 2347.2562                  | 0.0090             | 826.2182                   |
| 0.0113             | 918.0149                   | 0.0113             | 789.7467                   | 0.0113             | 850.4952                   | 0.0113             | 911.2459                   | 0.0113             | 2934.0382                  | 0.0113             | 1032.7459                  |
| 0.0135             | 1101.6149                  | 0.0135             | 947.7033                   | 0.0135             | 1020.6407                  | 0.0135             | 1093.5037                  | 0.0135             | 3520.8343                  | 0.0135             | 1239.2780                  |
| 0.0158             | 1285.2335                  | 0.0158             | 1105.6111                  | 0.0158             | 1190.6963                  | 0.0158             | 1275.7815                  | 0.0158             | 4107.7163                  | 0.0158             | 1445.9101                  |
| 0.0180             | 1468.8520                  | 0.0180             | 1263.6222                  | 0.0180             | 1360.7593                  | 0.0180             | 1457.9963                  | 0.0180             | 4694.4983                  | 0.0180             | 1652.4421                  |
| 0.0203             | 1652.4223                  | 0.0203             | 1421.5556                  | 0.0203             | 1530.9148                  | 0.0203             | 1640.2741                  | 0.0203             | 5277.3146                  | 0.0203             | 1859.0170                  |
| 0.0225             | 1836.0409                  | 0.0225             | 1579.4889                  | 0.0225             | 1700.9704                  | 0.0225             | 1822.4519                  | 0.0225             | 5831.9039                  | 0.0225             | 2065.5491                  |
| 0.0248             | 2019.6595                  | 0.0248             | 1737.4222                  | 0.0248             | 1871.1259                  | 0.0248             | 2004.7296                  | 0.0248             | 6386.4931                  | 0.0248             | 2272.1239                  |
| 0.0270             | 2203.2264                  | 0.0270             | 1895.4333                  | 0.0270             | 2041.1815                  | 0.0270             | 2187.0074                  | 0.0270             | 6941.1682                  | 0.0270             | 2478.6560                  |
| 0.0293             | 2386.7967                  | 0.0293             | 2053.3667                  | 0.0293             | 2211.3370                  | 0.0293             | 2369.2222                  | 0.0293             | 7495.7575                  | 0.0293             | 2685.1881                  |
| 0.0315             | 2570.4152                  | 0.0315             | 2211.3000                  | 0.0315             | 2381.4000                  | 0.0315             | 2551.5000                  | 0.0315             | 8050.3609                  | 0.0315             | 2891.7629                  |
| 0.0338             | 2754.0338                  | 0.0338             | 2369.2333                  | 0.0338             | 2551.4556                  | 0.0338             | 2733.7778                  | 0.0338             | 8604.9502                  | 0.0338             | 3098.2950                  |
| 0.0360             | 2937.6041                  | 0.0360             | 2527.1667                  | 0.0360             | 2721.6111                  | 0.0360             | 2915.9926                  | 0.0360             | 9032.7584                  | 0.0360             | 3304.8698                  |
| 0.0383             | 3121.2227                  | 0.0383             | 2685.1778                  | 0.0383             | 2891.6741                  | 0.0383             | 3098.2333                  | 0.0383             | 9082.6266                  | 0.0383             | 3511.4019                  |
| 0.0405             | 3304.8413                  | 0.0405             | 2843.1111                  | 0.0405             | 3061.8222                  | 0.0405             | 3280.5111                  | 0.0405             | 9132.4948                  | 0.0405             | 3717.9340                  |
| 0.0428             | 3488.4599                  | 0.0428             | 3001.0444                  | 0.0428             | 3231.8852                  | 0.0428             | 3462.7259                  | 0.0428             | 9182.3773                  | 0.0428             | 3924.5660                  |
| 0.0450             | 3672.0301                  | 0.0450             | 3158.9778                  | 0.0450             | 3402.0333                  | 0.0450             | 3645.0037                  | 0.0450             | 9232.2455                  | 0.0450             | 4131.0981                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP

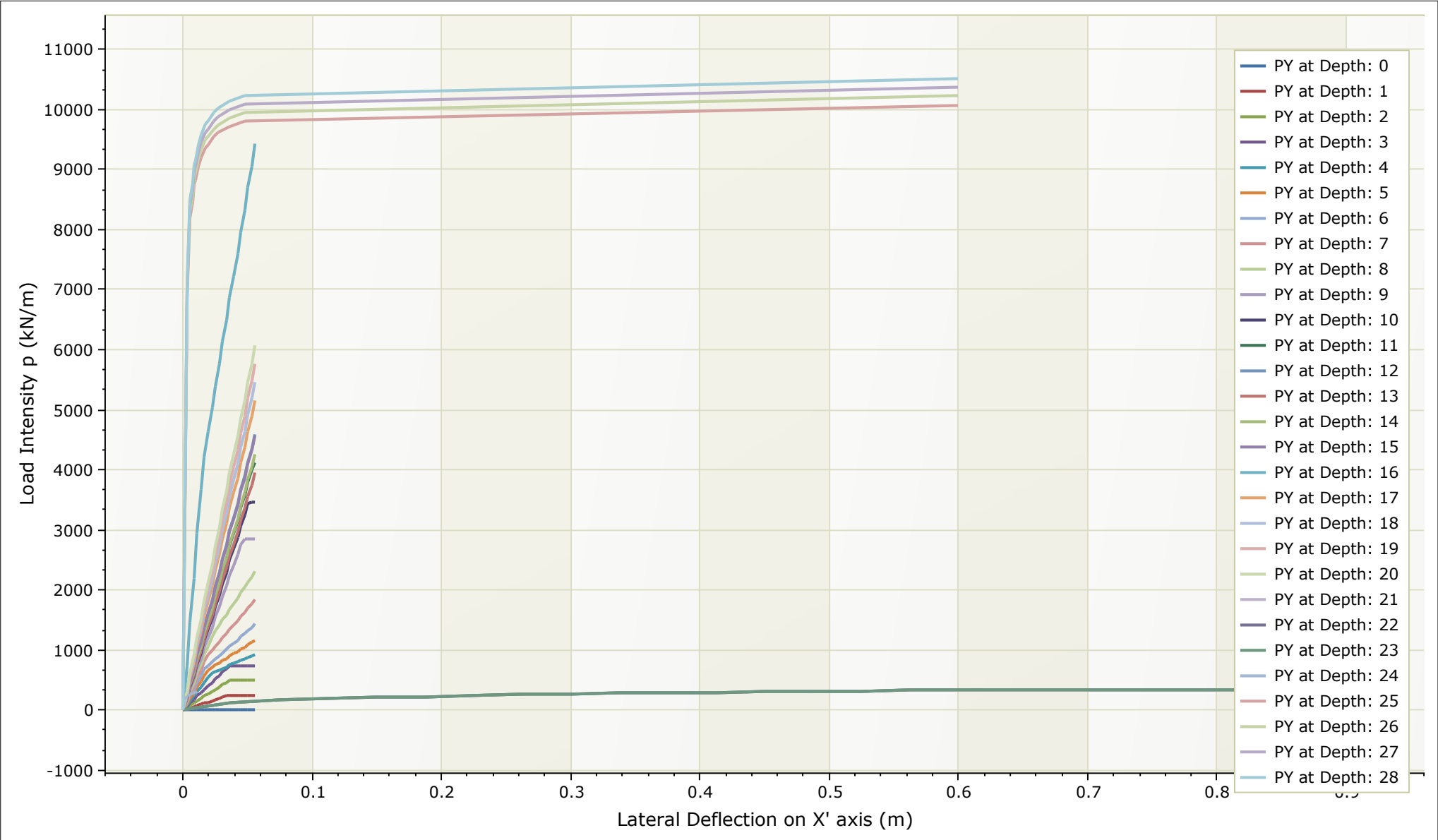


| D=1.20m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>18 | Load Intensity<br>p (kN/m) | PY at Depth:<br>19 | Load Intensity<br>p (kN/m) | PY at Depth:<br>20 | Load Intensity<br>p (kN/m) | PY at Depth:<br>21 | Load Intensity<br>p (kN/m) | PY at Depth:<br>22 | Load Intensity<br>p (kN/m) | PY at Depth:<br>23 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0023             | 218.7025                   | 0.0023             | 230.8502                   | 0.0023             | 242.9979                   | 0.0300             | 107.1000                   | 0.0300             | 107.1000                   | 0.0300             | 107.1000                   |
| 0.0045             | 437.4051                   | 0.0045             | 461.7004                   | 0.0045             | 485.9858                   | 0.0600             | 135.0000                   | 0.0600             | 135.0000                   | 0.0600             | 135.0000                   |
| 0.0068             | 656.1005                   | 0.0068             | 692.5420                   | 0.0068             | 728.9836                   | 0.0900             | 154.5000                   | 0.0900             | 154.5000                   | 0.0900             | 154.5000                   |
| 0.0090             | 874.8059                   | 0.0090             | 923.3922                   | 0.0090             | 971.9815                   | 0.1200             | 170.1000                   | 0.1200             | 170.1000                   | 0.1200             | 170.1000                   |
| 0.0113             | 1093.4770                  | 0.0113             | 1154.2082                  | 0.0113             | 1214.9395                  | 0.1500             | 183.2000                   | 0.1500             | 183.2000                   | 0.1500             | 183.2000                   |
| 0.0135             | 1312.1610                  | 0.0135             | 1385.0440                  | 0.0135             | 1457.9273                  | 0.1800             | 194.7000                   | 0.1800             | 194.7000                   | 0.1800             | 194.7000                   |
| 0.0158             | 1530.9450                  | 0.0158             | 1615.9799                  | 0.0158             | 1701.0150                  | 0.2100             | 205.0000                   | 0.2100             | 205.0000                   | 0.2100             | 205.0000                   |
| 0.0180             | 1749.6289                  | 0.0180             | 1846.8157                  | 0.0180             | 1944.0028                  | 0.2400             | 214.3000                   | 0.2400             | 214.3000                   | 0.2400             | 214.3000                   |
| 0.0203             | 1968.3415                  | 0.0203             | 2077.6660                  | 0.0203             | 2186.9909                  | 0.2700             | 222.9000                   | 0.2700             | 222.9000                   | 0.2700             | 222.9000                   |
| 0.0225             | 2187.0255                  | 0.0225             | 2308.5019                  | 0.0225             | 2429.9787                  | 0.3000             | 230.8000                   | 0.3000             | 230.8000                   | 0.3000             | 230.8000                   |
| 0.0248             | 2405.7381                  | 0.0248             | 2539.3522                  | 0.0248             | 2672.9665                  | 0.3300             | 238.3000                   | 0.3300             | 238.3000                   | 0.3300             | 238.3000                   |
| 0.0270             | 2624.4220                  | 0.0270             | 2770.1881                  | 0.0270             | 2915.9545                  | 0.3600             | 245.3000                   | 0.3600             | 245.3000                   | 0.3600             | 245.3000                   |
| 0.0293             | 2843.1060                  | 0.0293             | 3001.0239                  | 0.0293             | 3158.9423                  | 0.3900             | 251.9000                   | 0.3900             | 251.9000                   | 0.3900             | 251.9000                   |
| 0.0315             | 3061.8186                  | 0.0315             | 3231.8742                  | 0.0315             | 3401.9304                  | 0.4200             | 258.2000                   | 0.4200             | 258.2000                   | 0.4200             | 258.2000                   |
| 0.0338             | 3280.5025                  | 0.0338             | 3462.7101                  | 0.0338             | 3644.9182                  | 0.4500             | 264.3000                   | 0.4500             | 264.3000                   | 0.4500             | 264.3000                   |
| 0.0360             | 3499.2151                  | 0.0360             | 3693.5604                  | 0.0360             | 3887.9063                  | 0.4800             | 270.0000                   | 0.4800             | 270.0000                   | 0.4800             | 270.0000                   |
| 0.0383             | 3717.8991                  | 0.0383             | 3924.3962                  | 0.0383             | 4130.8940                  | 0.7200             | 270.0000                   | 0.7200             | 270.0000                   | 0.7200             | 270.0000                   |
| 0.0405             | 3936.5830                  | 0.0405             | 4155.2321                  | 0.0405             | 4373.8818                  |                    |                            |                    |                            |                    |                            |
| 0.0428             | 4155.2956                  | 0.0428             | 4386.0824                  | 0.0428             | 4616.8699                  |                    |                            |                    |                            |                    |                            |
| 0.0450             | 4374.0509                  | 0.0450             | 4617.0038                  | 0.0450             | 4859.8577                  |                    |                            |                    |                            |                    |                            |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.20m            |                            |                    |                            |                    |                            |                    |                               |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|-------------------------------|
| PY at Depth:<br>24 | Load Intensity<br>p (kN/m) | PY at Depth:<br>25 | Load Intensity<br>p (kN/m) | PY at Depth:<br>26 | Load Intensity<br>p (kN/m) | PY at Depth:<br>27 | Load<br>Intensity p<br>(kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                        |
| 0.0006             | 131.2643                   | 0.0024             | 5110.3548                  | 0.0024             | 5158.7419                  | 0.0024             | 5206.6129                     |
| 0.0012             | 154.7804                   | 0.0048             | 6259.6774                  | 0.0048             | 6332.3548                  | 0.0048             | 6405.0323                     |
| 0.0018             | 172.2491                   | 0.0058             | 6503.9677                  | 0.0058             | 6582.3871                  | 0.0058             | 6659.8065                     |
| 0.0024             | 185.1107                   | 0.0072             | 6767.5484                  | 0.0072             | 6852.4194                  | 0.0072             | 6936.3548                     |
| 0.0030             | 196.3000                   | 0.0077             | 6836.8387                  | 0.0077             | 6923.4194                  | 0.0077             | 7009.1290                     |
| 0.0036             | 205.4071                   | 0.0096             | 7053.4194                  | 0.0096             | 7145.4516                  | 0.0096             | 7236.9032                     |
| 0.0042             | 213.5473                   | 0.0115             | 7205.0000                  | 0.0115             | 7301.4839                  | 0.0115             | 7397.4516                     |
| 0.0048             | 221.0429                   | 0.0144             | 7364.0000                  | 0.0144             | 7465.0000                  | 0.0144             | 7565.0000                     |
| 0.0054             | 227.4268                   | 0.0154             | 7405.0000                  | 0.0154             | 7507.0000                  | 0.0154             | 7608.0000                     |
| 0.0060             | 233.5357                   | 0.0192             | 7529.5806                  | 0.0192             | 7635.5161                  | 0.0192             | 7740.0000                     |
| 0.0066             | 239.2321                   | 0.0221             | 7596.8710                  | 0.0221             | 7704.0323                  | 0.0221             | 7810.7742                     |
| 0.0072             | 244.4393                   | 0.0288             | 7703.8710                  | 0.0288             | 7814.5484                  | 0.0288             | 7923.5484                     |
| 0.0078             | 249.4357                   | 0.0288             | 7703.8710                  | 0.0288             | 7814.5484                  | 0.0288             | 7923.5484                     |
| 0.0084             | 254.0786                   | 0.0384             | 7793.4516                  | 0.0384             | 7906.5484                  | 0.0384             | 8019.0968                     |
| 0.0090             | 258.5018                   | 0.0384             | 7793.4516                  | 0.0384             | 7906.5484                  | 0.0384             | 8019.0968                     |
| 0.0096             | 262.7786                   | 0.4800             | 8053.0323                  | 0.4800             | 8173.6129                  | 0.4800             | 8293.6452                     |



|             |                               |                       |
|-------------|-------------------------------|-----------------------|
| <div></div> | ProjectPROYECTO CAVAROSA      |                       |
|             | Analysis DescriptionCurvas PY |                       |
|             | Drawn ByA. Andrew             | CompanyTecnilab, S.A. |
|             | Date22/3/2024, 09:12:59       | Tipo de PiloteD=1.50m |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.50m        |                            |                |                            |                |                            |                |                            |                |                            |                |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|
| PY at Depth: 0 | Load Intensity<br>p (kN/m) | PY at Depth: 1 | Load Intensity<br>p (kN/m) | PY at Depth: 2 | Load Intensity<br>p (kN/m) | PY at Depth: 3 | Load Intensity<br>p (kN/m) | PY at Depth: 4 | Load Intensity<br>p (kN/m) | PY at Depth: 5 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     |
| 0.0028         | 0.0000                     | 0.0028         | 19.1246                    | 0.0028         | 38.2502                    | 0.0028         | 57.3747                    | 0.0028         | 76.4994                    | 0.0028         | 95.6255                    |
| 0.0056         | 0.0000                     | 0.0056         | 38.2496                    | 0.0056         | 76.5012                    | 0.0056         | 114.7481                   | 0.0056         | 152.9948                   | 0.0056         | 191.2489                   |
| 0.0084         | 0.0000                     | 0.0084         | 57.3741                    | 0.0084         | 114.7555                   | 0.0084         | 172.1219                   | 0.0084         | 229.4973                   | 0.0084         | 286.8784                   |
| 0.0113         | 0.0000                     | 0.0113         | 76.4987                    | 0.0113         | 152.9987                   | 0.0113         | 229.4992                   | 0.0113         | 305.9997                   | 0.0113         | 382.4979                   |
| 0.0141         | 0.0000                     | 0.0141         | 95.6264                    | 0.0141         | 191.2508                   | 0.0141         | 286.8765                   | 0.0141         | 382.4921                   | 0.0141         | 478.1273                   |
| 0.0169         | 0.0000                     | 0.0169         | 114.7461                   | 0.0169         | 229.5030                   | 0.0169         | 344.2538                   | 0.0169         | 458.9945                   | 0.0169         | 573.7568                   |
| 0.0197         | 0.0000                     | 0.0197         | 133.8734                   | 0.0197         | 267.7552                   | 0.0197         | 401.6211                   | 0.0197         | 535.4970                   | 0.0197         | 669.3762                   |
| 0.0225         | 0.0000                     | 0.0225         | 152.9945                   | 0.0225         | 306.0073                   | 0.0225         | 458.9984                   | 0.0225         | 610.3223                   | 0.0225         | 714.8492                   |
| 0.0253         | 0.0000                     | 0.0253         | 172.1200                   | 0.0253         | 344.2585                   | 0.0253         | 516.3757                   | 0.0253         | 643.8758                   | 0.0253         | 752.8328                   |
| 0.0281         | 0.0000                     | 0.0281         | 191.2456                   | 0.0281         | 382.5017                   | 0.0281         | 573.7465                   | 0.0281         | 669.7793                   | 0.0281         | 789.8518                   |
| 0.0309         | 0.0000                     | 0.0309         | 210.3712                   | 0.0309         | 420.7539                   | 0.0309         | 631.1238                   | 0.0309         | 695.6828                   | 0.0309         | 826.8682                   |
| 0.0338         | 0.0000                     | 0.0338         | 229.4967                   | 0.0338         | 459.0060                   | 0.0338         | 688.4976                   | 0.0338         | 721.5843                   | 0.0338         | 863.8947                   |
| 0.0366         | 0.0000                     | 0.0366         | 237.0660                   | 0.0366         | 497.2078                   | 0.0366         | 735.2618                   | 0.0366         | 747.4798                   | 0.0366         | 900.9111                   |
| 0.0394         | 0.0000                     | 0.0394         | 237.0660                   | 0.0394         | 498.9599                   | 0.0394         | 735.2618                   | 0.0394         | 773.3833                   | 0.0394         | 937.9275                   |
| 0.0422         | 0.0000                     | 0.0422         | 237.0660                   | 0.0422         | 498.9599                   | 0.0422         | 735.2618                   | 0.0422         | 799.2848                   | 0.0422         | 974.9466                   |
| 0.0450         | 0.0000                     | 0.0450         | 237.0660                   | 0.0450         | 498.9599                   | 0.0450         | 735.2618                   | 0.0450         | 825.1802                   | 0.0450         | 1011.9927                  |
| 0.0478         | 0.0000                     | 0.0478         | 237.0660                   | 0.0478         | 498.9599                   | 0.0478         | 735.2618                   | 0.0478         | 851.0837                   | 0.0478         | 1049.0020                  |
| 0.0506         | 0.0000                     | 0.0506         | 237.0660                   | 0.0506         | 498.9599                   | 0.0506         | 735.2618                   | 0.0506         | 876.9872                   | 0.0506         | 1085.9959                  |
| 0.0534         | 0.0000                     | 0.0534         | 237.0660                   | 0.0534         | 498.9599                   | 0.0534         | 735.2618                   | 0.0534         | 902.8888                   | 0.0534         | 1122.9897                  |
| 0.0563         | 0.0000                     | 0.0563         | 237.0660                   | 0.0563         | 498.9599                   | 0.0563         | 735.2618                   | 0.0563         | 928.7842                   | 0.0563         | 1160.0094                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.50m        |                            |                |                            |                |                            |                |                            |                    |                            |                    |                            |
|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|----------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth: 6 | Load Intensity<br>p (kN/m) | PY at Depth: 7 | Load Intensity<br>p (kN/m) | PY at Depth: 8 | Load Intensity<br>p (kN/m) | PY at Depth: 9 | Load Intensity<br>p (kN/m) | PY at Depth:<br>10 | Load Intensity<br>p (kN/m) | PY at Depth:<br>11 | Load Intensity<br>p (kN/m) |
| 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000         | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0028         | 114.7517                   | 0.0028         | 133.8700                   | 0.0028         | 152.9968                   | 0.0028         | 172.1219                   | 0.0028             | 191.2526                   | 0.0028             | 210.3720                   |
| 0.0056         | 229.4992                   | 0.0056         | 267.7501                   | 0.0056         | 306.0035                   | 0.0056         | 344.2538                   | 0.0056             | 382.5053                   | 0.0056             | 420.7440                   |
| 0.0084         | 344.2538                   | 0.0084         | 401.6201                   | 0.0084         | 459.0003                   | 0.0084         | 516.3757                   | 0.0084             | 573.7679                   | 0.0084             | 631.1161                   |
| 0.0113         | 458.9984                   | 0.0113         | 535.5001                   | 0.0113         | 611.9970                   | 0.0113         | 688.4976                   | 0.0113             | 765.0205                   | 0.0113             | 841.4881                   |
| 0.0141         | 573.7501                   | 0.0141         | 669.3701                   | 0.0141         | 765.0038                   | 0.0141         | 860.6194                   | 0.0141             | 956.2732                   | 0.0141             | 1051.8617                  |
| 0.0169         | 680.4707                   | 0.0169         | 803.2502                   | 0.0169         | 918.0006                   | 0.0169         | 1032.7139                  | 0.0169             | 1147.5564                  | 0.0169             | 1262.2309                  |
| 0.0197         | 740.9237                   | 0.0197         | 916.0749                   | 0.0197         | 1070.9957                  | 0.0197         | 1204.8652                  | 0.0197             | 1338.7739                  | 0.0197             | 1472.6032                  |
| 0.0225         | 797.6174                   | 0.0225         | 991.2740                   | 0.0225         | 1219.9416                  | 0.0225         | 1377.0164                  | 0.0225             | 1530.0399                  | 0.0225             | 1682.9755                  |
| 0.0253         | 851.2333                   | 0.0253         | 1062.8024                  | 0.0253         | 1322.2435                  | 0.0253         | 1549.1612                  | 0.0253             | 1721.3089                  | 0.0253             | 1893.3479                  |
| 0.0281         | 903.7447                   | 0.0281         | 1132.8631                  | 0.0281         | 1412.0116                  | 0.0281         | 1721.2189                  | 0.0281             | 1912.5264                  | 0.0281             | 2103.7202                  |
| 0.0309         | 956.2561                   | 0.0309         | 1203.0076                  | 0.0309         | 1501.7571                  | 0.0309         | 1893.3701                  | 0.0309             | 2103.7954                  | 0.0309             | 2314.0926                  |
| 0.0338         | 1008.7746                  | 0.0338         | 1273.1522                  | 0.0338         | 1591.5251                  | 0.0338         | 2065.5214                  | 0.0338             | 2295.0613                  | 0.0338             | 2524.4649                  |
| 0.0366         | 1061.2744                  | 0.0366         | 1343.3129                  | 0.0366         | 1681.2706                  | 0.0366         | 2237.5791                  | 0.0366             | 2486.2788                  | 0.0366             | 2734.8372                  |
| 0.0394         | 1113.8387                  | 0.0394         | 1413.4574                  | 0.0394         | 1771.0387                  | 0.0394         | 2409.7303                  | 0.0394             | 2677.5478                  | 0.0394             | 2945.2096                  |
| 0.0422         | 1166.3030                  | 0.0422         | 1483.6020                  | 0.0422         | 1860.8455                  | 0.0422         | 2581.8751                  | 0.0422             | 2868.8138                  | 0.0422             | 3155.5819                  |
| 0.0450         | 1218.8673                  | 0.0450         | 1553.7465                  | 0.0450         | 1950.5522                  | 0.0450         | 2754.0263                  | 0.0450             | 3060.0828                  | 0.0450             | 3365.9543                  |
| 0.0478         | 1271.3316                  | 0.0478         | 1623.8072                  | 0.0478         | 2040.3203                  | 0.0478         | 2855.1729                  | 0.0478             | 3251.3003                  | 0.0478             | 3576.3234                  |
| 0.0506         | 1323.8669                  | 0.0506         | 1693.9518                  | 0.0506         | 2130.0658                  | 0.0506         | 2855.1729                  | 0.0506             | 3430.8178                  | 0.0506             | 3786.6957                  |
| 0.0534         | 1376.3602                  | 0.0534         | 1764.1125                  | 0.0534         | 2219.8339                  | 0.0534         | 2855.1729                  | 0.0534             | 3459.0285                  | 0.0534             | 3997.0681                  |
| 0.0563         | 1428.8955                  | 0.0563         | 1834.2570                  | 0.0563         | 2309.5793                  | 0.0563         | 2855.1729                  | 0.0563             | 3459.0285                  | 0.0563             | 4118.7649                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.50m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>12 | Load Intensity<br>p (kN/m) | PY at Depth:<br>13 | Load Intensity<br>p (kN/m) | PY at Depth:<br>14 | Load Intensity<br>p (kN/m) | PY at Depth:<br>15 | Load Intensity<br>p (kN/m) | PY at Depth:<br>16 | Load Intensity<br>p (kN/m) | PY at Depth:<br>17 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0028             | 229.5046                   | 0.0028             | 197.4411                   | 0.0028             | 212.6263                   | 0.0028             | 227.8115                   | 0.0028             | 733.5014                   | 0.0028             | 258.1943                   |
| 0.0056             | 459.0092                   | 0.0056             | 394.8722                   | 0.0056             | 425.2526                   | 0.0056             | 455.6230                   | 0.0056             | 1467.0429                  | 0.0056             | 516.3844                   |
| 0.0084             | 688.5138                   | 0.0084             | 592.3133                   | 0.0084             | 637.8781                   | 0.0084             | 683.4344                   | 0.0084             | 2200.4857                  | 0.0084             | 774.5787                   |
| 0.0113             | 918.0184                   | 0.0113             | 789.7544                   | 0.0113             | 850.5044                   | 0.0113             | 911.2522                   | 0.0113             | 2933.9857                  | 0.0113             | 1032.7459                  |
| 0.0141             | 1147.5440                  | 0.0141             | 987.1789                   | 0.0141             | 1063.0815                  | 0.0141             | 1139.1074                  | 0.0141             | 3667.5286                  | 0.0141             | 1290.9503                  |
| 0.0169             | 1377.0426                  | 0.0169             | 1184.6667                  | 0.0169             | 1275.7778                  | 0.0169             | 1366.8889                  | 0.0169             | 4218.7000                  | 0.0169             | 1549.1975                  |
| 0.0197             | 1606.5248                  | 0.0197             | 1382.0778                  | 0.0197             | 1488.3741                  | 0.0197             | 1594.6704                  | 0.0197             | 4633.2000                  | 0.0197             | 1807.3447                  |
| 0.0225             | 1836.0652                  | 0.0225             | 1579.4889                  | 0.0225             | 1700.9704                  | 0.0225             | 1822.5148                  | 0.0225             | 5025.1000                  | 0.0225             | 2065.5491                  |
| 0.0253             | 2065.5057                  | 0.0253             | 1776.9000                  | 0.0253             | 1913.6667                  | 0.0253             | 2050.3333                  | 0.0253             | 5398.2143                  | 0.0253             | 2323.6962                  |
| 0.0281             | 2295.0461                  | 0.0281             | 1974.4111                  | 0.0281             | 2126.2630                  | 0.0281             | 2278.1148                  | 0.0281             | 5764.7000                  | 0.0281             | 2581.9434                  |
| 0.0309             | 2524.5865                  | 0.0309             | 2171.8222                  | 0.0309             | 2338.8593                  | 0.0309             | 2505.8963                  | 0.0309             | 6131.1429                  | 0.0309             | 2840.0906                  |
| 0.0338             | 2754.0270                  | 0.0338             | 2369.2333                  | 0.0338             | 2551.4556                  | 0.0338             | 2733.7778                  | 0.0338             | 6497.5857                  | 0.0338             | 3098.2950                  |
| 0.0366             | 2983.5674                  | 0.0366             | 2566.6444                  | 0.0366             | 2764.1519                  | 0.0366             | 2961.5593                  | 0.0366             | 6864.0286                  | 0.0366             | 3356.4994                  |
| 0.0394             | 3213.0496                  | 0.0394             | 2764.1556                  | 0.0394             | 2976.7481                  | 0.0394             | 3189.3407                  | 0.0394             | 7230.4714                  | 0.0394             | 3614.6893                  |
| 0.0422             | 3442.5901                  | 0.0422             | 2961.5667                  | 0.0422             | 3189.3444                  | 0.0422             | 3417.2222                  | 0.0422             | 7596.9143                  | 0.0422             | 3872.8937                  |
| 0.0450             | 3672.0887                  | 0.0450             | 3158.9778                  | 0.0450             | 3402.0407                  | 0.0450             | 3645.0037                  | 0.0450             | 7963.4143                  | 0.0450             | 4131.0409                  |
| 0.0478             | 3901.5709                  | 0.0478             | 3356.4111                  | 0.0478             | 3614.6370                  | 0.0478             | 3872.7852                  | 0.0478             | 8329.9000                  | 0.0478             | 4389.2453                  |
| 0.0506             | 4131.1113                  | 0.0506             | 3553.9000                  | 0.0506             | 3827.2333                  | 0.0506             | 4100.6667                  | 0.0506             | 8696.3429                  | 0.0506             | 4647.4925                  |
| 0.0534             | 4360.5518                  | 0.0534             | 3751.3111                  | 0.0534             | 4039.8296                  | 0.0534             | 4328.4481                  | 0.0534             | 9062.7857                  | 0.0534             | 4905.6396                  |
| 0.0563             | 4590.0922                  | 0.0563             | 3948.7222                  | 0.0563             | 4252.5259                  | 0.0563             | 4556.2296                  | 0.0563             | 9429.2286                  | 0.0563             | 5163.8440                  |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.50m            |                            |                    |                            |                    |                            |                    |                            |                    |                            |                    |                            |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|
| PY at Depth:<br>18 | Load Intensity<br>p (kN/m) | PY at Depth:<br>19 | Load Intensity<br>p (kN/m) | PY at Depth:<br>20 | Load Intensity<br>p (kN/m) | PY at Depth:<br>21 | Load Intensity<br>p (kN/m) | PY at Depth:<br>22 | Load Intensity<br>p (kN/m) | PY at Depth:<br>23 | Load Intensity<br>p (kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     |
| 0.0028             | 273.3750                   | 0.0028             | 288.5535                   | 0.0028             | 303.7500                   | 0.0375             | 133.9000                   | 0.0375             | 133.9000                   | 0.0375             | 133.9000                   |
| 0.0056             | 546.7457                   | 0.0056             | 577.1156                   | 0.0056             | 607.5000                   | 0.0750             | 168.8000                   | 0.0750             | 168.8000                   | 0.0750             | 168.8000                   |
| 0.0084             | 820.1206                   | 0.0084             | 865.6691                   | 0.0084             | 911.2500                   | 0.1125             | 193.2000                   | 0.1125             | 193.2000                   | 0.1125             | 193.2000                   |
| 0.0113             | 1093.4770                  | 0.0113             | 1154.2169                  | 0.0113             | 1215.0000                  | 0.1500             | 212.6000                   | 0.1500             | 212.6000                   | 0.1500             | 212.6000                   |
| 0.0141             | 1366.8748                  | 0.0141             | 1442.8103                  | 0.0141             | 1518.8000                  | 0.1875             | 229.0000                   | 0.1875             | 229.0000                   | 0.1875             | 229.0000                   |
| 0.0169             | 1640.2013                  | 0.0169             | 1731.3182                  | 0.0169             | 1822.5000                  | 0.2250             | 243.4000                   | 0.2250             | 243.4000                   | 0.2250             | 243.4000                   |
| 0.0197             | 1913.6277                  | 0.0197             | 2019.9116                  | 0.0197             | 2126.3000                  | 0.2625             | 256.2000                   | 0.2625             | 256.2000                   | 0.2625             | 256.2000                   |
| 0.0225             | 2187.0255                  | 0.0225             | 2308.4339                  | 0.0225             | 2430.0000                  | 0.3000             | 267.9000                   | 0.3000             | 267.9000                   | 0.3000             | 267.9000                   |
| 0.0253             | 2460.3519                  | 0.0253             | 2597.0273                  | 0.0253             | 2733.8000                  | 0.3375             | 278.6000                   | 0.3375             | 278.6000                   | 0.3375             | 278.6000                   |
| 0.0281             | 2733.7497                  | 0.0281             | 2885.5351                  | 0.0281             | 3037.5000                  | 0.3750             | 288.6000                   | 0.3750             | 288.6000                   | 0.3750             | 288.6000                   |
| 0.0309             | 3007.1047                  | 0.0309             | 3174.1285                  | 0.0309             | 3341.3000                  | 0.4125             | 297.9000                   | 0.4125             | 297.9000                   | 0.4125             | 297.9000                   |
| 0.0338             | 3280.5025                  | 0.0338             | 3462.6508                  | 0.0338             | 3645.0000                  | 0.4500             | 306.6000                   | 0.4500             | 306.6000                   | 0.4500             | 306.6000                   |
| 0.0366             | 3553.8289                  | 0.0366             | 3751.2442                  | 0.0366             | 3948.8000                  | 0.4875             | 314.9000                   | 0.4875             | 314.9000                   | 0.4875             | 314.9000                   |
| 0.0394             | 3827.2267                  | 0.0394             | 4039.8376                  | 0.0394             | 4252.5000                  | 0.5250             | 322.8000                   | 0.5250             | 322.8000                   | 0.5250             | 322.8000                   |
| 0.0422             | 4100.5818                  | 0.0422             | 4328.3455                  | 0.0422             | 4556.3000                  | 0.5625             | 330.3000                   | 0.5625             | 330.3000                   | 0.5625             | 330.3000                   |
| 0.0450             | 4373.9796                  | 0.0450             | 4616.9389                  | 0.0450             | 4860.0000                  | 0.6000             | 337.5000                   | 0.6000             | 337.5000                   | 0.6000             | 337.5000                   |
| 0.0478             | 4647.3774                  | 0.0478             | 4905.4611                  | 0.0478             | 5163.8000                  | 0.9000             | 337.5000                   | 0.9000             | 337.5000                   | 0.9000             | 337.5000                   |
| 0.0506             | 4920.7038                  | 0.0506             | 5194.0545                  | 0.0506             | 5467.5000                  |                    |                            |                    |                            |                    |                            |
| 0.0534             | 5194.1302                  | 0.0534             | 5482.5624                  | 0.0534             | 5771.3000                  |                    |                            |                    |                            |                    |                            |
| 0.0563             | 5467.4566                  | 0.0563             | 5771.1558                  | 0.0563             | 6075.0000                  |                    |                            |                    |                            |                    |                            |

Trabajo: 2-1259  
 Proyecto: CAVAROSA  
 Cliente: SFERA PROPERTIES CORP



| D=1.50m            |                            |                    |                            |                    |                            |                    |                               |                    |                               |
|--------------------|----------------------------|--------------------|----------------------------|--------------------|----------------------------|--------------------|-------------------------------|--------------------|-------------------------------|
| PY at Depth:<br>24 | Load Intensity<br>p (kN/m) | PY at Depth:<br>25 | Load Intensity<br>p (kN/m) | PY at Depth:<br>26 | Load Intensity<br>p (kN/m) | PY at Depth:<br>27 | Load<br>Intensity p<br>(kN/m) | PY at Depth:<br>28 | Load<br>Intensity p<br>(kN/m) |
| 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                     | 0.0000             | 0.0000                        | 0.0000             | 0.0000                        |
| 0.0008             | 156.2893                   | 0.0030             | 6895.6897                  | 0.0030             | 6965.8000                  | 0.0030             | 7035.1379                     | 0.0030             | 7102.4000                     |
| 0.0015             | 184.2071                   | 0.0060             | 8194.4138                  | 0.0060             | 8294.0000                  | 0.0060             | 8392.0000                     | 0.0060             | 8487.8000                     |
| 0.0023             | 204.9929                   | 0.0072             | 8459.8276                  | 0.0072             | 8565.8000                  | 0.0072             | 8671.2069                     | 0.0072             | 8773.0000                     |
| 0.0030             | 220.3143                   | 0.0090             | 8743.0690                  | 0.0090             | 8856.4000                  | 0.0090             | 8968.8276                     | 0.0090             | 9078.2000                     |
| 0.0038             | 233.6375                   | 0.0096             | 8817.0690                  | 0.0096             | 8932.2000                  | 0.0096             | 9046.8276                     | 0.0096             | 9158.2000                     |
| 0.0045             | 244.4321                   | 0.0120             | 9045.8966                  | 0.0120             | 9167.8000                  | 0.0120             | 9288.2414                     | 0.0120             | 9405.4000                     |
| 0.0053             | 254.1098                   | 0.0144             | 9205.7241                  | 0.0144             | 9331.6000                  | 0.0144             | 9456.4483                     | 0.0144             | 9578.6000                     |
| 0.0060             | 263.0429                   | 0.0180             | 9371.1379                  | 0.0180             | 9501.4000                  | 0.0180             | 9630.6552                     | 0.0180             | 9757.2000                     |
| 0.0068             | 270.7348                   | 0.0192             | 9413.1379                  | 0.0192             | 9545.2000                  | 0.0192             | 9674.8621                     | 0.0192             | 9803.2000                     |
| 0.0075             | 278.0321                   | 0.0240             | 9541.9655                  | 0.0240             | 9677.2000                  | 0.0240             | 9812.0690                     | 0.0240             | 9942.8000                     |
| 0.0083             | 284.7375                   | 0.0276             | 9610.9655                  | 0.0276             | 9748.0000                  | 0.0276             | 9884.2759                     | 0.0276             | 10015.6000                    |
| 0.0090             | 290.9393                   | 0.0360             | 9719.3793                  | 0.0360             | 9860.6000                  | 0.0360             | 9999.0690                     | 0.0360             | 10134.0000                    |
| 0.0098             | 296.9045                   | 0.0360             | 9719.3793                  | 0.0360             | 9860.6000                  | 0.0360             | 9999.0690                     | 0.0360             | 10134.0000                    |
| 0.0105             | 302.4268                   | 0.0480             | 9810.7931                  | 0.0480             | 9954.6000                  | 0.0480             | 10098.2759                    | 0.0480             | 10234.0000                    |
| 0.0113             | 307.6893                   | 0.0480             | 9810.7931                  | 0.0480             | 9954.6000                  | 0.0480             | 10098.2759                    | 0.0480             | 10234.0000                    |
|                    |                            | 0.6000             | 10070.6897                 | 0.6000             | 10222.0000                 | 0.6000             | 10370.3448                    | 0.6000             | 10520.0000                    |



**APENDICE G**  
**DETALLE DE LOCALIZACIÓN**

**TECNILAB, S. A.**

## DETALLE DE LOCALIZACION

Trabajo No. : 2-1259  
Proyecto: CAVAROSA  
Localización: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
Cliente : SFERA PROPERTIES CORP  
Fecha: MARZO, 2024



## DETALLE DE LOCALIZACIÓN

Trabajo No. : 2-1259  
Proyecto: CAVAROSA  
Localización: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
Cliente : SFERA PROPERTIES CORP  
Fecha: MARZO, 2024



| COORDENADAS WGS 84 |          |           |
|--------------------|----------|-----------|
| Nº                 | ESTE (m) | NORTE (m) |
| 1                  | 658972   | 988495    |
| 2                  | 658977   | 988478    |
| 3                  | 658977   | 988461    |
| 4                  | 658993   | 988447    |
| 5                  | 659017   | 988449    |
| PP1                | 658977   | 988484    |
| PP2                | 658964   | 988472    |
| PP3                | 658980   | 988461    |

■ PRUEBAS DE PLACA

⊗ PERFORACIÓN MECÁNICA ROTATIVA

Sin Escala



**APENDICE H**  
**ENSAYO DOWNHOLE**

**TECNILAB, S. A.**



**TECNILAB, S. A.**

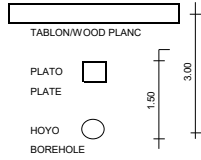
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DOWNHOLE /  
SHEAR WAVE VELOCITY TEST**

TRABAJO/JOB No. 2-1259 CLIENTE : SFERA PROPERTIES CORP HOYO No. 5  
PROYECTO/PROJECT: CAVAROSA  
ENSAYADO/TESTED: TECNILAB, S.A. FECHA/DATE: 7-mar-24 PROFUNDIDAD/DEPTH: 1.00 m - 30.00 m  
OPERADO POR/OPERATED BY: J. SOLANILLA, M. GONZALES, M. MAGALLON, G. RUIZ  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ

**ESQUEMA DEL ENSAYO**



PESO DEL MASC 8 lb  
HAMMER WEIGHT  
EQUIPO.....Sismógrafo con Geófono Vertical  
EQUIPMENT

| LECTURA<br>No. | PROF. /<br>DEPTH<br>(m) | PROF. CORR. /<br>CORR. DEPTH<br>(m) | TIEMPO /<br>TIME<br>(ms) | VELOCIDAD DE ONDA CORTANTE /<br>SHEAR WAVE VELOCITY<br>Vs (m/s) | VELOCIDAD<br>PROMEDIO / AVERAGE<br>VELOCITY (m/s) | MATERIAL                                       |
|----------------|-------------------------|-------------------------------------|--------------------------|-----------------------------------------------------------------|---------------------------------------------------|------------------------------------------------|
| 1              | 1.00                    | 3.16                                | 11.60                    | 272.61                                                          | 323.30                                            | RELLENO LIMO<br>ELASTICO ARENOSO<br>CON GRAVAS |
| 2              | 2.00                    | 3.61                                | 12.90                    | 340.98                                                          |                                                   |                                                |
| 3              | 3.00                    | 4.24                                | 14.50                    | 398.18                                                          |                                                   |                                                |
| 4              | 4.00                    | 5.00                                | 16.70                    | 344.25                                                          |                                                   |                                                |
| 5              | 5.00                    | 5.83                                | 19.50                    | 296.77                                                          |                                                   |                                                |
| 6              | 6.00                    | 6.71                                | 22.30                    | 313.30                                                          |                                                   |                                                |
| 7              | 7.00                    | 7.62                                | 25.10                    | 324.13                                                          |                                                   |                                                |
| 8              | 8.00                    | 8.54                                | 27.60                    | 371.29                                                          |                                                   |                                                |
| 9              | 9.00                    | 9.49                                | 31.20                    | 261.90                                                          |                                                   |                                                |
| 10             | 10.00                   | 10.44                               | 35.10                    | 244.48                                                          |                                                   |                                                |
| 11             | 11.00                   | 11.40                               | 37.90                    | 343.37                                                          |                                                   |                                                |
| 12             | 12.00                   | 12.37                               | 41.30                    | 284.58                                                          |                                                   |                                                |
| 13             | 13.00                   | 13.34                               | 44.10                    | 347.27                                                          |                                                   |                                                |
| 14             | 14.00                   | 14.32                               | 46.60                    | 390.46                                                          |                                                   |                                                |
| 15             | 15.00                   | 15.30                               | 49.70                    | 315.88                                                          |                                                   |                                                |
| 16             | 16.00                   | 16.28                               | 52.00                    | 426.85                                                          | 426.85                                            | BOULDERS                                       |
| 17             | 17.00                   | 17.26                               | 54.40                    | 409.94                                                          | 340.18                                            | ARENA LIMOSA                                   |
| 18             | 18.00                   | 18.25                               | 57.50                    | 317.94                                                          |                                                   |                                                |
| 19             | 19.00                   | 19.24                               | 61.20                    | 266.78                                                          |                                                   |                                                |
| 20             | 20.00                   | 20.22                               | 63.90                    | 366.06                                                          |                                                   |                                                |
| 21             | 21.00                   | 21.21                               | 67.30                    | 291.02                                                          | 217.74                                            | LIMO ELASTICO<br>ARENOSO                       |
| 22             | 22.00                   | 22.20                               | 72.40                    | 194.20                                                          |                                                   |                                                |
| 23             | 23.00                   | 23.19                               | 78.30                    | 168.00                                                          |                                                   |                                                |
| 24             | 24.00                   | 24.19                               | 80.50                    | 450.88                                                          | 450.88                                            | ROCA METEORIZADA<br>CONGLOMERADO               |
| 25             | 25.00                   | 25.18                               | 81.50                    | 992.58                                                          | 872.15                                            | ROCA SANA<br>CONGLOMERADO                      |
| 26             | 26.00                   | 26.17                               | 82.60                    | 902.86                                                          |                                                   |                                                |
| 27             | 27.00                   | 27.17                               | 83.70                    | 903.32                                                          |                                                   |                                                |
| 28             | 28.00                   | 28.16                               | 85.00                    | 764.69                                                          |                                                   |                                                |
| 29             | 29.00                   | 29.15                               | 86.30                    | 765.00                                                          |                                                   |                                                |
| 30             | 30.00                   | 30.15                               | 87.40                    | 904.42                                                          |                                                   |                                                |
|                |                         |                                     |                          |                                                                 |                                                   |                                                |

$$V_s = \frac{S_d}{\sum_{i=1}^n \frac{1}{V_s}} = 360 \text{ m/s}$$



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**VELOCIDAD DE ONDA DE COMPRESIÓN/  
COMPRESSION WAVE VELOCITY**

**Vp**

TRABAJO/JOB No. 2-1259 CLIENTE : SFERA PROPERTIES CORP

HOYO No. 5

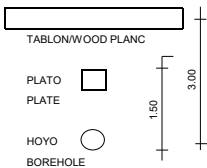
PROYECTO/PROJECT: CAVAROSA

ENSAYADO/TESTED: TECNILAB, S.A. FECHA/DATE: 7-mar-24 PROFUNDIDAD/DEPTH 1.00 m - 30.00 m

OPERADO POR/OPERATED BY: J. SOLANILLA, M. GONZALES, M. MAGALLON, G. RUIZ

LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ

**ESQUEMA DEL ENSAYO**



PESO DEL MAS( 8 lb  
HAMMER WEIGHT  
EQUIPO ..... Sismógrafo con Geófono Vertical  
EQUIPMENT

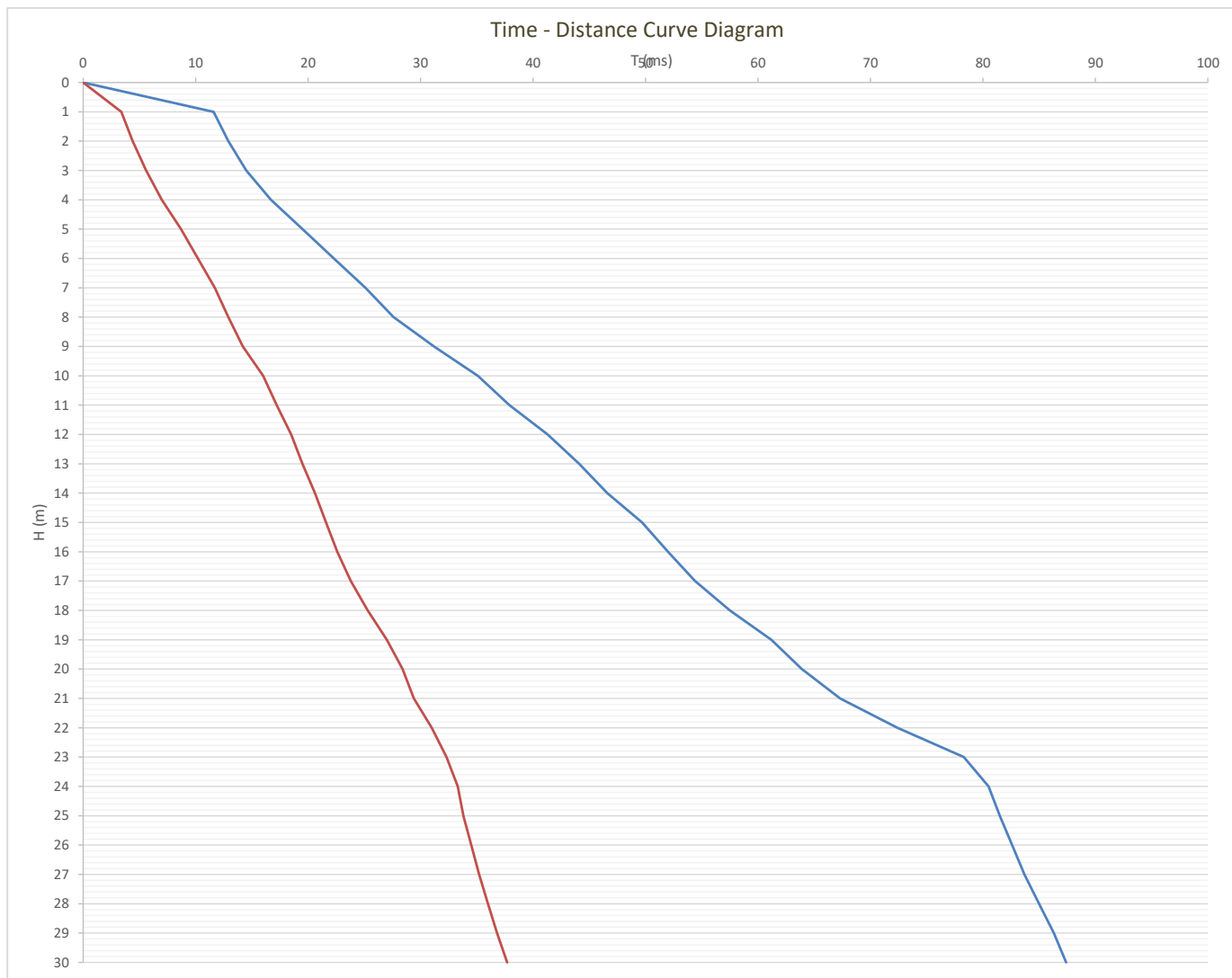
| LECTURA<br>No. | PROF. /<br>DEPTH<br>(m) | PROF. CORR. /<br>CORR. DEPTH<br>(m) | TIEMPO /<br>TIME<br>(ms) | VELOCIDAD DE ONDA DE<br>COMPRESIÓN / COMPRESSION<br>WAVE VELOCITY<br>Vp (m/s) | VELOCIDAD<br>PROMEDIO /<br>AVERAGE VELOCITY<br>(m/s) | MATERIAL                                       |
|----------------|-------------------------|-------------------------------------|--------------------------|-------------------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------|
| 1              | 1.00                    | 1.80                                | 3.40                     | 530.23                                                                        | 736.48                                               | RELLENO LIMO<br>ELASTICO ARENOSO<br>CON GRAVAS |
| 2              | 2.00                    | 2.50                                | 4.40                     | 697.22                                                                        |                                                      |                                                |
| 3              | 3.00                    | 3.35                                | 5.60                     | 711.75                                                                        |                                                      |                                                |
| 4              | 4.00                    | 4.27                                | 7.00                     | 655.64                                                                        |                                                      |                                                |
| 5              | 5.00                    | 5.22                                | 8.70                     | 557.74                                                                        |                                                      |                                                |
| 6              | 6.00                    | 6.18                                | 10.20                    | 643.00                                                                        |                                                      |                                                |
| 7              | 7.00                    | 7.16                                | 11.70                    | 649.50                                                                        |                                                      |                                                |
| 8              | 8.00                    | 8.14                                | 12.90                    | 817.08                                                                        |                                                      |                                                |
| 9              | 9.00                    | 9.12                                | 14.20                    | 757.49                                                                        |                                                      |                                                |
| 10             | 10.00                   | 10.11                               | 16.00                    | 548.74                                                                        |                                                      |                                                |
| 11             | 11.00                   | 11.10                               | 17.20                    | 824.94                                                                        |                                                      |                                                |
| 12             | 12.00                   | 12.09                               | 18.50                    | 762.76                                                                        |                                                      |                                                |
| 13             | 13.00                   | 13.09                               | 19.50                    | 992.87                                                                        |                                                      |                                                |
| 14             | 14.00                   | 14.08                               | 20.60                    | 903.52                                                                        |                                                      |                                                |
| 15             | 15.00                   | 15.07                               | 21.60                    | 994.69                                                                        | 995.35                                               | BOULDERS                                       |
| 16             | 16.00                   | 16.07                               | 22.60                    | 995.35                                                                        |                                                      |                                                |
| 17             | 17.00                   | 17.07                               | 23.80                    | 829.91                                                                        | 698.16                                               | ARENA LIMOSA                                   |
| 18             | 18.00                   | 18.06                               | 25.30                    | 664.23                                                                        |                                                      |                                                |
| 19             | 19.00                   | 19.06                               | 27.00                    | 586.31                                                                        |                                                      |                                                |
| 20             | 20.00                   | 20.06                               | 28.40                    | 712.18                                                                        |                                                      |                                                |
| 21             | 21.00                   | 21.05                               | 29.40                    | 997.33                                                                        | 796.11                                               | LIMO ELASTICO<br>ARENOSO                       |
| 22             | 22.00                   | 22.05                               | 31.00                    | 623.48                                                                        |                                                      |                                                |
| 23             | 23.00                   | 23.05                               | 32.30                    | 767.53                                                                        |                                                      |                                                |
| 24             | 24.00                   | 24.05                               | 33.30                    | 997.97                                                                        | 997.97                                               | ROCA METEORIZADA<br>CONGLOMERADO               |
| 25             | 25.00                   | 25.04                               | 33.80                    | 1996.26                                                                       | 1409.12                                              | ROCA SANA<br>CONGLOMERADO                      |
| 26             | 26.00                   | 26.04                               | 34.50                    | 1426.11                                                                       |                                                      |                                                |
| 27             | 27.00                   | 27.04                               | 35.20                    | 1426.29                                                                       |                                                      |                                                |
| 28             | 28.00                   | 28.04                               | 36.00                    | 1248.14                                                                       |                                                      |                                                |
| 29             | 29.00                   | 29.04                               | 36.80                    | 1248.27                                                                       |                                                      |                                                |
| 30             | 30.00                   | 30.04                               | 37.70                    | 1109.68                                                                       |                                                      |                                                |
|                |                         |                                     |                          |                                                                               |                                                      |                                                |

CLIENTE/CLIENT: SFERA PROPERTIES CORP

HOYO/BOREHOLE: 5

PROYECTO/PROJECT: CAVAROSA

UBICACIÓN/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ



**TECNILAB, S. A.**

UNA EMPRESA E. BARRANCO Y ASOC., S.  
LABORATORIO DE SUELOS Y MATERIALES

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**APENDICE I**  
**PERFILES DE PERFORACION**

**TECNILAB, S. A.**



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 1 | HOJA No.: | 1      | DE | 3      | PERFORADORA:        | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 10/17, 2024 |       |
| COORDENADAS:  | 658972                              |           |   | E         | 988495 |    |        | N                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                        | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu<br>kg/cm² | RQD   | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD<br>20 40 60 80 |  |  |  |  |
|-------|-------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|--------------|-------|-------------------|----------------|----------------------|-------|-------------|---------------------------------------|--|--|--|--|
| 0.00  |       |         | RELLENO COMPUESTO POR LIMO, CONSISTENCIA FIRME, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJO, COLOR CHOCOLATE CLARO. ESTRUCTURA HOMOGÉNEA.                                               | 1          | A               | 4     |              |       | 45                | 100.0          | 18.3                 |       | T           |                                       |  |  |  |  |
| 0.60  |       |         |                                                                                                                                                                                                 | 5          |                 |       |              |       |                   |                |                      |       | S           |                                       |  |  |  |  |
| 1.05  |       |         |                                                                                                                                                                                                 | 5          |                 |       |              |       |                   |                |                      |       |             | T                                     |  |  |  |  |
| 1.50  |       |         |                                                                                                                                                                                                 | 2          | A               | 4     |              |       |                   | 45             | 100.0                | 20.9  |             | S                                     |  |  |  |  |
| 1.95  |       |         |                                                                                                                                                                                                 | 4          |                 | 4     |              |       |                   |                |                      |       |             | T                                     |  |  |  |  |
| 3.00  |       |         | RELLENO COMPUESTO POR ARENA DE GRANO MEDIO A FINO, PLASTICIDAD NULA, CONTENIDO NATURAL DE HUMEDAD BAJO, COLOR GRISÁCEO. ESTRUCTURA HOMOGÉNEA.                                                   | 3          | A               | 8     |              |       |                   |                |                      |       | S           |                                       |  |  |  |  |
| 3.45  |       |         | RELLENO COMPUESTO POR GRAVAS DE HASTA 0.05m, CONSISTENCIA DURA, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA.                                   |            |                 | 11    |              |       | 45                | 100.0          | 17.4                 |       | S           |                                       |  |  |  |  |
| 4.50  |       |         |                                                                                                                                                                                                 | 20         |                 |       |              |       |                   |                |                      |       | T           |                                       |  |  |  |  |
| 4.75  |       |         |                                                                                                                                                                                                 | 30         |                 |       | 25           | 100.0 | 7.0               |                |                      |       | S           |                                       |  |  |  |  |
| 6.00  |       |         |                                                                                                                                                                                                 | 5          | A               |       |              |       | 150               | 40.0           |                      |       | D           |                                       |  |  |  |  |
| 6.45  |       |         |                                                                                                                                                                                                 |            |                 |       |              |       |                   |                |                      |       |             |                                       |  |  |  |  |
| 7.50  |       |         | 6.00m.-13.50m.: BOULDERS DE ARENISCAS DE GRANO FINO A MEDIO, ESTRUCTURA CEMENTADA, DE GRANO FINO A MEDIO, TAMAÑOS MÁXIMOS DE 15cm, DE COLOR GRIS CLARO A OSCURO, RESISTENCIA MUY DÉBIL A DÉBIL. | 6          | A               |       |              |       | 150               | 26.7           |                      |       | D           |                                       |  |  |  |  |
| 7.95  |       |         |                                                                                                                                                                                                 |            |                 |       |              |       |                   |                |                      |       |             |                                       |  |  |  |  |
| 9.00  |       |         |                                                                                                                                                                                                 | 7          | A               |       |              |       | 150               | 26.7           |                      |       | D           |                                       |  |  |  |  |
| 9.45  |       |         |                                                                                                                                                                                                 |            |                 |       |              |       |                   |                |                      |       |             |                                       |  |  |  |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

**OBSERVACIONES:**  
NF: 12.40m A LAS 24 HORAS  
PERFORADOR: J. CEDEÑO  
DESCRIPCION / DIBUJO: A. HERNÁNDEZ

GEÓLOGO: A. HERNÁNDEZ



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EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 1 | HOJA No.: | 2      | DE | 3      | PERFORADORA:        | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 10/17, 2024 |       |
| COORDENADAS:  | 658972                              |           |   | E         | 988495 |    |        | N                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                        | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |  |  |  |
|-------|-------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|------------------------|--|--|--|
| *     |       |         |                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             | 20 40 60 80            |  |  |  |
| 10.50 |       |         | 6.00m.-13.50m.: BOULDERS DE ARENISCAS DE GRANO FINO A MEDIO, ESTRUCTURA CEMENTADA, DE GRANO FINO A MEDIO, TAMAÑOS MÁXIMOS DE 15cm, DE COLOR GRIS CLARO A OSCURO, RESISTENCIA MUY DÉBIL A DÉBIL. | 8          | A               |       |           |     | 150            | 40.0           |                   |       | D           |                        |  |  |  |
| 10.95 |       |         |                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             | D                      |  |  |  |
| 12.00 |       |         |                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             | T                      |  |  |  |
| 12.40 |       |         |                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             | T                      |  |  |  |
| 12.45 |       |         |                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             |                        |  |  |  |
| 13.50 |       |         | ARENA LIMOSA DE GRANO FINO, COMPACIDAD MUY SUELTA A SUELTA, PLASTICIDAD MEDIA, CONTENIDO NATURAL DE HUMEDAD MEDIA A BAJA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA ABUNDANTES CONCHAS. | 10         | A               | 4     |           |     |                |                |                   |       | S           |                        |  |  |  |
| 13.95 |       |         |                                                                                                                                                                                                 |            |                 | 3     |           |     | 45             | 100.0          | 30.2              |       | T           |                        |  |  |  |
| 15.00 |       |         |                                                                                                                                                                                                 |            |                 | 3     |           |     | 45             | 100.0          | 30.2              |       | S           |                        |  |  |  |
| 15.45 |       |         |                                                                                                                                                                                                 |            |                 | 4     |           |     |                |                |                   |       | T           |                        |  |  |  |
| 16.50 |       |         |                                                                                                                                                                                                 |            |                 | 3     |           |     | 45             | 100.0          | 19.9              |       | S           |                        |  |  |  |
| 16.95 |       |         |                                                                                                                                                                                                 |            |                 | 2     |           |     |                |                |                   |       | T           |                        |  |  |  |
| 18.00 |       |         | 19.50m.-20.26m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2)...                                               | 13         | A               | 4     |           |     | 45             | 100.0          | 14.0              |       | S           |                        |  |  |  |
| 18.95 |       |         |                                                                                                                                                                                                 |            |                 | 4     |           |     |                |                |                   |       |             |                        |  |  |  |
| 19.50 |       |         |                                                                                                                                                                                                 |            |                 | 3     |           |     |                |                |                   |       |             |                        |  |  |  |
| 20.26 |       |         |                                                                                                                                                                                                 |            |                 |       |           |     | 100            | 150            | 100               |       | D           |                        |  |  |  |

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A - Alterada  
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T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 1 | HOJA No.: | 3      | DE | 3      | PERFORADORA:        | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 10/17, 2024 |       |
| COORDENADAS:  | 658972                              |           |   | E         | 988495 |    |        | N                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                  | MUESTRA Nº | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |  |
|-------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|------------------------|----|----|----|--|
| *     |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             | 20                     | 40 | 60 | 80 |  |
| 21.00 |       |         | ... RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 14mm SUBREDONDEADOS, DE COLOR CHOCOLATE, GRISES, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE. ESPACIAMIENTO (0.60-2.00m), ROCA POCO FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 10°, PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA.                                                                | 2          | R               |       | 254.0     |     |                |                |                   |       | D           |                        |    |    |    |  |
| 21.10 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |
| 22.50 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |
| 23.30 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |
| 24.00 |       |         | 20.26m.-26.00m.: ROCA SANA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: MODERADAMENTE SUAVE (RH-2), RESISTENCIA DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 30mm SUBREDONDEADOS, DE COLOR GRIS, VERDOSOS, MATRIZ DE GRANO FINO DE COLOR GRIS CLARO. ESPACIAMIENTO (>2.00m), ROCA SIN FRACTURAS. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS, PLANAS, RUGOSAS, LIMPIAS Y CERRADAS (1-3mm). CON CALCITA DE RELLENO. | 3          | R               |       | 219.0     | 100 | 150            | 100            |                   |       | D           |                        |    |    |    |  |
| 25.50 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |
| 25.80 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |
| 26.00 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5          | R               |       | 209.7     | 100 | 150            | 100            |                   |       | D           |                        |    |    |    |  |
|       |       |         | FIN DEL SONDEO                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante  
RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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EN  
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## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |  |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|--|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 2 | HOJA No.: | 1      | DE | 3      | PERFORADORA:        | 10-25 |  |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |  |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |  |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 19/23, 2024 |       |  |
| COORDENADAS:  | 658977                              |           |   | E         | 988478 |    |        | N                   |       |  |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                    | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu<br>kg/cm² | RQD | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |
|-------|-------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|--------------|-----|-------------------|----------------|----------------------|-------|-------------|------------------------|----|----|----|
| *     |       |         |                                                                                                                                                                                                                                             |            |                 |       |              |     |                   |                |                      |       |             | 20                     | 40 | 60 | 80 |
| 0.00  |       |         | RELLENO COMPUESTO POR LIMO ELÁSTICO<br>ARENOSO CON GRAVAS SUBANGULARES DE<br>0.01m, CONSISTENCIA MEDIANAMENTE FIRME,<br>PLASTICIDAD MEDIA A ALTA, CONTENIDO<br>NATURAL DE HUMEDAD BAJA A MEDIA, COLOR<br>CHOCOLATE. ESTRUCTURA HETEROGÉNEA. | 1          | A               | 4     |              |     | 45                | 100.0          | 12.0                 |       | T           |                        |    |    |    |
| 0.60  |       |         |                                                                                                                                                                                                                                             |            |                 | 3     |              |     |                   |                |                      |       | S           |                        |    |    |    |
| 1.05  |       |         |                                                                                                                                                                                                                                             |            |                 | 3     |              |     |                   |                |                      |       |             | T                      |    |    |    |
| 1.50  |       |         |                                                                                                                                                                                                                                             |            | 2               | A     | 5            |     |                   | 45             | 100.0                | 27.7  |             | S                      |    |    |    |
| 1.95  |       |         |                                                                                                                                                                                                                                             |            | 6               |       |              |     |                   |                |                      |       |             |                        |    |    |    |
| 3.00  |       |         |                                                                                                                                                                                                                                             |            | 6               |       |              |     |                   |                |                      |       | T           |                        |    |    |    |
| 3.45  |       |         |                                                                                                                                                                                                                                             | 3          | A               | 2     |              |     | 45                | 100.0          | 30.7                 |       | S           |                        |    |    |    |
| 4.50  |       |         |                                                                                                                                                                                                                                             |            | 3               |       |              |     |                   |                |                      |       |             |                        |    |    |    |
| 4.50  |       |         |                                                                                                                                                                                                                                             | 4          | A               | 50    |              |     | 5                 | 100.0          | 7.9                  |       | T           |                        |    |    |    |
| 4.55  |       |         |                                                                                                                                                                                                                                             |            |                 |       |              |     |                   |                |                      |       | S           |                        |    |    |    |
| 6.00  |       |         | RELLENO COMPUESTO POR LIMO ELÁSTICO<br>CON POCA ARENA Y GRAVAS DE HASTA 0.02m<br>SUBANGULARES, CONSISTENCIA DURA,<br>PLASTICIDAD MEDIA A ALTA, CONTENIDO<br>NATURAL DE HUMEDAD BAJA A MEDIA, COLOR<br>CHOCOLATE. ESTRUCTURA HETEROGÉNEA.    | 5          | A               | 20    |              |     | 25                | 80.0           | 7.2                  |       | T           |                        |    |    |    |
| 6.25  |       |         |                                                                                                                                                                                                                                             |            |                 | 50    |              |     |                   |                |                      |       |             | S                      |    |    |    |
| 7.50  |       |         |                                                                                                                                                                                                                                             |            | 6               | A     | 25           |     |                   | 20             | 75.0                 | 27.5  |             | T                      |    |    |    |
| 7.70  |       |         |                                                                                                                                                                                                                                             |            |                 | 50    |              |     |                   |                |                      |       |             | S                      |    |    |    |
| 9.00  |       |         |                                                                                                                                                                                                                                             |            |                 |       |              |     |                   |                |                      |       |             |                        |    |    |    |
| 9.25  |       |         |                                                                                                                                                                                                                                             | 7          | A               | 10    |              |     | 25                | 100.0          | 16.2                 |       | T           |                        |    |    |    |
|       |       |         |                                                                                                                                                                                                                                             |            |                 | 50    |              |     |                   |                |                      |       | S           |                        |    |    |    |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

**OBSERVACIONES:**  
NF: NO SE OBSERVÓ  
PERFORADOR: J. CEDEÑO  
DESCRIPCION / DIBUJO: A. HERNÁNDEZ

GEÓLOGO: A. HERNÁNDEZ



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1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |   |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|---|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 2 | HOJA No.: | 2 | DE | 3      | PERFORADORA:        | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |   |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |   |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |   |    | FECHA: | FEBRERO 19/23, 2024 |       |
| COORDENADAS:  | 658977 E                            |           |   | 988478 N  |   |    |        |                     |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                          | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD<br>20 40 60 80 |   |  |  |  |  |
|-------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|---------------------------------------|---|--|--|--|--|
| 10.50 |       |         | RELLENO COMPUESTO POR LIMO ELÁSTICO CON POCA ARENA Y GRAVAS DE HASTA 0.02m SUBANGULARES, CONSISTENCIA FIRME A DURA, PLASTICIDAD MEDIA A ALTA, CONTENIDO NATURAL DE HUMEDAD BAJA A MEDIA, COLOR CHOCOLATE. ESTRUCTURA HETEROGÉNEA. | 8          | A               | 10    |           |     | 45             | 100.0          | 29.6              |       | T           |                                       |   |  |  |  |  |
| 10.95 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             | S                                     |   |  |  |  |  |
| 12.00 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             |                                       | T |  |  |  |  |
| 12.45 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             |                                       | S |  |  |  |  |
| 13.50 |       |         |                                                                                                                                                                                                                                   | 10         | A               | 3     |           |     |                |                |                   |       |             |                                       |   |  |  |  |  |
| 13.95 |       |         | ARENA LIMOSA DE GRANO FINO, COMPACIDAD SUELTA, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD MEDIA, COLOR GRISÁCEO. ESTRUCTURA HOMOGÉNEA.                                                                                        |            |                 | 2     |           |     | 45             | 100.0          | 29.5              |       | S           |                                       |   |  |  |  |  |
| 15.00 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             | T                                     |   |  |  |  |  |
| 15.45 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             |                                       | S |  |  |  |  |
| 16.50 |       |         | LIMO ARENOSO, CONSISTENCIA FIRME, PLASTICIDAD MEDIA, CONTENIDO NATURAL DE HUMEDAD MEDIA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA ABUNDANTES CONCHAS.                                                                    | 12         | A               | 4     |           |     |                |                |                   |       |             |                                       |   |  |  |  |  |
| 16.95 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             | S                                     |   |  |  |  |  |
| 17.50 |       |         |                                                                                                                                                                                                                                   |            |                 | 5     |           |     | 45             | 100.0          | 36.1              |       |             |                                       |   |  |  |  |  |
| 18.00 |       |         | 17.50m.-18.36m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2), RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA...     | 1          | R               |       |           | 100 | 50             | 100            |                   |       | D           |                                       |   |  |  |  |  |
| 18.36 |       |         |                                                                                                                                                                                                                                   |            |                 |       |           |     |                |                |                   |       |             |                                       |   |  |  |  |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 2 | HOJA No.: | 3      | DE | 3      | PERFORADORA:        | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 19/23, 2024 |       |
| COORDENADAS:  | 658977                              |           |   | E         | 988478 |    |        | N                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                             | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |
|-------|-------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|------------------------|----|----|----|
| *     |       |         |                                                                                                                                                                                                                                                      |            |                 |       |           |     |                |                |                   |       |             | 20                     | 40 | 60 | 80 |
| 18.90 |       |         | ... CON CLASTOS DE HASTA 10mm SUBREDONDEADOS, DE COLOR CHOCOLATE, ANARANJADOS, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE.                                                                                                                   | 2          | R               |       | 243.6     | 100 | 150            | 100            |                   |       | D           |                        |    |    |    |
| 19.50 |       |         | ESPACIAMIENTO (0.60-2.00m), ROCA POCO FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 40°, PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA.                                                                     | 3          | R               |       |           | 100 | 150            | 100            |                   |       | D           |                        |    |    |    |
| 21.00 |       |         | 18.36m.-23.50m.: ROCA SANA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: MODERADAMENTE SUAVE (RH-2), RESISTENCIA DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 40mm                                                | 4          | R               |       | 142.0     | 100 | 150            | 100            |                   |       | D           |                        |    |    |    |
| 21.10 |       |         | SUBREDONDEADOS, DE COLOR GRIS, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR GRIS CLARO. ESPACIAMIENTO (>2.00m), ROCA SIN FRACTURAS. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS, PLANAS, RUGOSAS, LIMPIAS Y CERRADAS (1-3mm). CON CALCITA DE RELLENO. | 5          | R               |       |           | 100 | 100            | 100            |                   |       | D           |                        |    |    |    |
| 22.50 |       |         |                                                                                                                                                                                                                                                      |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |
| 23.30 |       |         |                                                                                                                                                                                                                                                      |            |                 |       | 121.7     |     |                |                |                   |       |             |                        |    |    |    |
| 23.50 |       |         | FIN DEL SONDEO                                                                                                                                                                                                                                       |            |                 |       |           |     |                |                |                   |       |             |                        |    |    |    |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante  
RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                     |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|---------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 3 | HOJA No.: | 1      | DE | 3      | PERFORADORA:        | 10-32 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                     |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                     |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | FEBRERO 26/27, 2024 |       |
| COORDENADAS:  | 658977                              |           |   | E         | 988461 |    |        | N                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                      | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu<br>kg/cm² | RQD | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |  |
|-------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|--------------|-----|-------------------|----------------|----------------------|-------|-------------|------------------------|----|----|----|--|
| *     |       |         |                                                                                                                                                                                                                                               |            |                 |       |              |     |                   |                |                      |       |             | 20                     | 40 | 60 | 80 |  |
| 0.00  |       |         | RELLENO COMPUESTO POR LIMO CON GRAVAS DE HASTA 0.02m SUBANGULARES, CONSISTENCIA FIRME, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA A MEDIA, COLOR CHOCOLATE. ESTRUCTURA HETEROGÉNEA.                                                  | 1          | A               | 7     |              |     | 45                | 100.0          | 27.7                 |       | T           |                        |    |    |    |  |
| 0.60  |       |         |                                                                                                                                                                                                                                               |            |                 | 7     |              |     |                   |                |                      |       | S           | ●                      | ■  |    |    |  |
| 1.05  |       |         |                                                                                                                                                                                                                                               |            |                 | 8     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 1.50  |       |         |                                                                                                                                                                                                                                               |            | 2               | A     | 4            |     |                   | 45             | 100.0                | 19.2  |             | S                      | ●  | ■  |    |  |
| 1.95  |       |         |                                                                                                                                                                                                                                               |            |                 | 4     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 3.00  |       |         |                                                                                                                                                                                                                                               | 3          | A               | 4     |              |     | 45                | 100.0          | 17.5                 |       | S           | ●                      | ■  |    |    |  |
| 3.45  |       |         |                                                                                                                                                                                                                                               |            | 4               |       |              |     |                   |                |                      | T     |             |                        |    |    |    |  |
| 4.50  |       |         |                                                                                                                                                                                                                                               | 4          | A               | 4     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 4.55  |       |         | RELLENO COMPUESTO POR LIMO ELÁSTICO CON ARENA Y GRAVAS DE HASTA 0.02m SUBANGULARES, CONSISTENCIA FIRME A MUY FIRME, PLASTICIDAD MEDIA A ALTA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR CHOCOLATE GRISÁCEO A GRISÁCEO. ESTRUCTURA HETEROGÉNEA. |            |                 | 6     |              |     | 45                | 100.0          | 23.2                 |       | S           | ●                      | ■  |    |    |  |
|       |       |         |                                                                                                                                                                                                                                               |            |                 | 4     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 6.00  |       |         |                                                                                                                                                                                                                                               |            | 5               | A     | 4            |     |                   | 45             | 100.0                | 18.0  |             | S                      | ●  | ■  |    |  |
| 6.45  |       |         |                                                                                                                                                                                                                                               |            |                 | 2     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                                                                               |            |                 | 5     |              |     |                   |                |                      |       | S           | ●                      | ■  |    |    |  |
| 7.50  |       |         |                                                                                                                                                                                                                                               | 6          | A               | 5     |              |     | 45                | 88.9           | 20.2                 |       | S           | ■                      | ●  |    |    |  |
| 7.95  |       |         |                                                                                                                                                                                                                                               |            | 9               |       |              |     |                   |                |                      | T     |             |                        |    |    |    |  |
| 9.00  |       |         |                                                                                                                                                                                                                                               | 7          | A               | 6     |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 9.45  |       |         | RELLENO COMPUESTO POR ARENA DE GRANO FINO CON LIMO ELÁSTICO, COMPACIDAD FIRME, PLASTICIDAD BAJA...                                                                                                                                            |            |                 | 7     |              |     | 45                | 100.0          | 20.6                 |       | S           | ■                      | ●  |    |    |  |
|       |       |         |                                                                                                                                                                                                                                               |            |                 | 7     |              |     |                   |                |                      |       |             |                        |    |    |    |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

**OBSERVACIONES:**  
NF: NO SE OBSERVÓ  
PERFORADOR: A. NIETO  
DESCRIPCION / DIBUJO: A. HERNÁNDEZ

GEÓLOGO: A. HERNÁNDEZ



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EN  
1973

## PERFIL DE PERFORACION

TRABAJO No.: 2-1259 HOYO No.: 3 HOJA No.: 2 DE 3 PERFORADORA: 10-32  
PROYECTO : CAVAROSA  
LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
CLIENTE : SFERA PROPERTIES CORP FECHA: FEBRERO 26/27, 2024  
COORDENADAS: 658977 E 988461 N

| PROF.<br>ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                        | MUESTRA N° | TIPO DE MUESTRA | N<br>SPT | qu<br>kg/cm² | RQD | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | N SPT<br>% HUMEDAD |
|----------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|----------|--------------|-----|-------------------|----------------|----------------------|-------|-------------|--------------------|
| *              |         |                                                                                                                                                                                                 |            |                 |          |              |     |                   |                |                      |       |             | 20 40 60 80        |
| 10.50          |         | ... CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR CHOCOLATE GRISÁCEO. ESTRUCTURA HOMOGÉNEA.                                                                                                          | 8          | A               | 50       |              |     | 10                | 100.0          | 14.3                 |       | T           | ● ●                |
| 10.60          |         |                                                                                                                                                                                                 |            |                 |          |              |     |                   |                |                      |       | S           |                    |
| 12.00          |         | BOULDERS                                                                                                                                                                                        | 9          | A               | 18       |              |     |                   |                |                      |       | T           |                    |
| 12.20          |         | FRAGMENTOS DE BOULDERS                                                                                                                                                                          |            |                 | 50       |              |     | 20                | 75.0           | 18.8                 |       | S           | ● ●                |
| 13.50          |         | BOULDERS                                                                                                                                                                                        | 10         | A               | 9        |              |     |                   |                |                      |       | T           |                    |
| 13.95          |         |                                                                                                                                                                                                 |            |                 | 11       |              |     | 45                | 66.7           | 82.0                 |       | S           | ● ●                |
| 15.00          |         |                                                                                                                                                                                                 | 11         | A               | 5        |              |     |                   |                |                      |       | T           |                    |
| 15.45          |         | ARENA LIMOSA DE GRANO FINO, COMPACIDAD FIRME A SUELTA, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD ALTA A MEDIA, COLOR GRISÁCEO. ESTRUCTURA HOMOGÉNEA. PRESENTA CONCHAS.                     |            |                 | 6        |              |     | 45                | 100.0          | 45.4                 |       | S           | ● ●                |
| 16.50          |         |                                                                                                                                                                                                 | 12         | A               | 4        |              |     |                   |                |                      |       | T           |                    |
| 16.95          |         |                                                                                                                                                                                                 |            |                 | 5        |              |     | 45                | 100.0          | 36.7                 |       | S           | ● ●                |
| 18.00          |         |                                                                                                                                                                                                 | 13         | A               | 3        |              |     |                   |                |                      |       | T           |                    |
| 18.45          |         | LIMO ARENOSO (ML), CONSISTENCIA SUAVE A MEDIANAMENTE FIRME, PLASTICIDAD MEDIA, CONTENIDO NATURAL DE HUMEDAD MEDIA A ALTA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA ABUNDANTES CONCHAS. |            |                 | 2        |              |     | 45                | 100.0          | 27.6                 |       | S           | ● ●                |
| 19.50          |         |                                                                                                                                                                                                 | 14         | A               | 3        |              |     |                   |                |                      |       | T           |                    |
| 19.95          |         |                                                                                                                                                                                                 |            |                 | 4        |              |     | 45                | 100.0          | 51.3                 |       | S           | ● ●                |
| 20.00          |         |                                                                                                                                                                                                 |            |                 | 2        |              |     |                   |                |                      |       |             |                    |

### ABREVIATURAS:

A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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## PERFIL DE PERFORACION

TRABAJO No.: 2-1259 HOYO No.: 3 HOJA No.: 3 DE 3 PERFORADORA: 10-32  
PROYECTO : CAVAROSA  
LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
CLIENTE : SFERA PROPERTIES CORP FECHA: FEBRERO 26/27, 2024  
COORDENADAS: 658977 E 988461 N

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | MUESTRA N° | TIPO DE MUESTRA | N<br>SPT | qu<br>kg/cm² | RQD   | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |
|-------|-------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|----------|--------------|-------|-------------------|----------------|----------------------|-------|-------------|------------------------|----|----|----|
| *     |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                 |          |              |       |                   |                |                      |       |             | 20                     | 40 | 60 | 80 |
| 21.00 |       |         | LIMO ARENOSO (ML)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1          | I               |          |              |       | 90                | 88.9           |                      |       | SH          |                        |    |    |    |
| 21.90 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                 |          |              |       |                   |                |                      |       |             |                        |    |    |    |
| 22.50 |       |         | 22.50m.-23.25m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2), RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 15mm SUBREDONDEADOS, DE COLOR CHOCOLATE, ANARANJADOS, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE. ESPACIAMIENTO (0.60-2.00m), ROCA POCO FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 10°, PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA. | 1          | R               |          |              | 100   | 150               | 100            |                      |       | D           |                        |    |    |    |
| 23.35 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                 |          |              |       |                   |                |                      |       |             |                        |    |    |    |
| 24.00 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            | 2               | R        |              | 211.1 | 100               | 150            | 100                  |       |             | D                      |    |    |    |
| 25.50 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                 |          |              |       |                   |                |                      |       |             |                        |    |    |    |
| 25.70 |       |         | 23.25m.-28.50m.: ROCA SANA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: MODERADAMENTE SUAVE (RH-2), RESISTENCIA DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 20mm SUBREDONDEADOS, DE COLOR GRIS, VIOLÁCEOS, NEGROS, MATRIZ DE GRANO FINO DE COLOR GRIS CLARO. ESPACIAMIENTO (>2.00m), ROCA SIN FRACTURAS. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS, PLANAS, RUGOSAS, LIMPIAS Y CERRADAS (1-3mm). CON CALCITA DE RELLENO.                                                                          | 3          | R               |          | 136.5        | 100   | 150               | 100            |                      |       | D           |                        |    |    |    |
| 27.00 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                 |          |              |       |                   |                |                      |       |             |                        |    |    |    |
| 27.65 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            | 4               | R        |              | 74.7  | 100               | 150            | 100                  |       |             | D                      |    |    |    |
| 28.50 |       |         | FIN DEL SONDEO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |                 |          |              |       |                   |                |                      |       |             |                        |    |    |    |

### ABREVIATURAS:

A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
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RQD - Índice de Calidad de la Roca  
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qu - Compresión Simple



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                   |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|-------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 4 | HOJA No.: | 1      | DE | 4      | PERFORADORA:      | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                   |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                   |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | MARZO 01/04, 2024 |       |
| COORDENADAS:  | 658993                              |           |   | E         | 988447 |    |        | N                 |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                 | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu<br>kg/cm² | RQD | PENETRACIÓN<br>cm | % RECUPERACION | % HUMEDAD<br>NATURAL | FORRO | HERRAMIENTA | ● N SPT<br>■ % HUMEDAD |    |    |    |  |
|-------|-------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|--------------|-----|-------------------|----------------|----------------------|-------|-------------|------------------------|----|----|----|--|
| *     |       |         |                                                                                                                                                                                          |            |                 |       |              |     |                   |                |                      |       |             | 20                     | 40 | 60 | 80 |  |
| 0.00  |       |         | RELLENO COMPUESTO POR LIMO CON GRAVAS DE HASTA 0.02m SUBANGULARES, CONSISTENCIA MUY FIRME, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR CHOCOLATE. ESTRUCTURA HETEROGÉNEA. | 1          | A               | 6     |              |     | 45                | 100.0          | 20.0                 |       | T           |                        |    |    |    |  |
| 0.60  |       |         |                                                                                                                                                                                          |            |                 | 7     |              |     |                   |                |                      |       | S           |                        |    |    |    |  |
| 1.05  |       |         |                                                                                                                                                                                          |            |                 | 7     |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 1.50  |       |         |                                                                                                                                                                                          |            | 2               | A     | 12           |     |                   | 45             | 100.0                | 17.3  |             | T                      |    |    |    |  |
| 1.95  |       |         |                                                                                                                                                                                          |            |                 | 11    |              |     |                   |                |                      |       | S           |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            |                 | 13    |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 3.00  |       |         |                                                                                                                                                                                          |            | 3               | A     | 13           |     |                   | 45             | 100.0                | 19.9  |             | T                      |    |    |    |  |
| 3.45  |       |         |                                                                                                                                                                                          |            |                 | 15    |              |     |                   |                |                      |       | S           |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            |                 | 17    |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 4.50  |       |         |                                                                                                                                                                                          |            | 4               | A     | 12           |     |                   | 45             | 100.0                | 10.2  |             | T                      |    |    |    |  |
| 4.95  |       |         |                                                                                                                                                                                          |            |                 | 10    |              |     |                   |                |                      |       | S           |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            |                 | 10    |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 6.00  |       |         |                                                                                                                                                                                          | 5          | A               | 10    |              |     | 45                | 100.0          | 18.6                 |       | T           |                        |    |    |    |  |
| 6.45  |       |         |                                                                                                                                                                                          |            | 12              |       |              |     |                   |                |                      | S     |             |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            | 13              |       |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 7.50  |       |         |                                                                                                                                                                                          | 6          | A               | 14    |              |     |                   |                |                      |       | T           |                        |    |    |    |  |
| 7.95  |       |         | GRAVAS CON POCO LIMO, DE TAMAÑOS HASTA 0.03m SUBANGULARES, CONSISTENCIA DURA, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRISÁCEO. ESTRUCTURA HETEROGÉNEA.               |            |                 | 15    |              |     | 45                | 100.0          | 18.9                 |       | S           |                        |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            |                 | 17    |              |     |                   |                |                      |       |             |                        |    |    |    |  |
| 9.00  |       |         |                                                                                                                                                                                          | 7          | A               | 14    |              |     |                   | 45             | 100.0                | 21.9  |             | T                      |    |    |    |  |
|       |       |         |                                                                                                                                                                                          |            |                 | 18    |              |     |                   |                |                      |       | S           |                        |    |    |    |  |
| 9.45  |       |         |                                                                                                                                                                                          |            | 22              |       |              |     |                   |                |                      |       |             |                        |    |    |    |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

**OBSERVACIONES:**  
NF: NO SE OBSERVÓ  
PERFORADOR: J. CEDEÑO  
DESCRIPCION / DIBUJO: A. HERNÁNDEZ

GEÓLOGO: A. HERNÁNDEZ



**TECNILAB, S. A.**  
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1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                   |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|-------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 4 | HOJA No.: | 2      | DE | 4      | PERFORADORA:      | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                   |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                   |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | MARZO 01/04, 2024 |       |
| COORDENADAS:  | 658993                              |           |   | E         | 988447 |    |        | N                 |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                   | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | N SPT | % HUMEDAD |  |
|-------|-------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|-------|-----------|--|
| *     |       |         |                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             |       |           |  |
| 10.50 |       |         | GRAVAS CON POCO LIMO, DE TAMAÑOS HASTA 0.03m SUBANGULARES, CONSISTENCIA DURA, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRISÁCEO. ESTRUCTURA HETEROGÉNEA. | 8          | A               | 19    |           |     |                |                |                   |       | T           |       |           |  |
| 10.95 |       |         |                                                                                                                                                                            |            |                 |       |           |     | 45             | 100.0          | 17.7              | S     |             |       |           |  |
| 12.00 |       |         |                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             | T     |           |  |
| 12.20 |       |         |                                                                                                                                                                            |            |                 | 9     | A         | 24  |                |                |                   |       |             | S     |           |  |
| 13.50 |       |         |                                                                                                                                                                            |            |                 |       |           | 50  |                | 20             | 100.0             | 15.7  |             |       |           |  |
| 13.95 |       |         |                                                                                                                                                                            | 10         | A               | 22    |           |     |                |                |                   | T     |             |       |           |  |
| 15.00 |       |         |                                                                                                                                                                            |            |                 | 20    |           | 45  | 100.0          | 19.2           |                   | S     |             |       |           |  |
| 15.10 |       |         |                                                                                                                                                                            |            |                 | 25    |           |     |                |                |                   | T     |             |       |           |  |
| 16.50 |       |         |                                                                                                                                                                            | 11         | A               | 50    |           | 10  | 0.0            | 0.0            |                   | S     |             |       |           |  |
| 16.95 |       |         | ARENA LIMOSA DE GRANO FINO, CONSISTENCIA FIRME, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD MEDIA A ALTA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNE. PRESENTA CONCHAS.     |            |                 |       |           |     |                |                |                   |       | T           |       |           |  |
| 18.00 |       |         |                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       | S           |       |           |  |
| 18.45 |       |         |                                                                                                                                                                            |            |                 | 13    | A         | 6   |                |                |                   |       |             | T     |           |  |
| 19.50 |       |         |                                                                                                                                                                            |            |                 |       |           | 6   |                | 45             | 100.0             | 20.9  |             | S     |           |  |
| 19.95 |       |         | LIMO ELÁSTICO CON ARENA, CONSISTENCIA MUY FIRME, PLASTICIDAD ALTA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA CONCHAS.           | 14         | A               | 8     |           |     |                |                |                   |       | T           |       |           |  |
|       |       |         |                                                                                                                                                                            |            |                 |       |           | 9   |                | 45             | 100.0             | 46.5  |             | S     |           |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                   |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|-------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 4 | HOJA No.: | 3      | DE | 4      | PERFORADORA:      | 10-25 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                   |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                   |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | MARZO 01/04, 2024 |       |
| COORDENADAS:  | 658993                              |           |   | E         | 988447 |    |        | N                 |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | N SPT<br>% HUMEDAD |    |    |    |  |
|-------|-------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|--------------------|----|----|----|--|
| *     |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             | 20                 | 40 | 60 | 80 |  |
| 21.00 |       |         | LIMO ELÁSTICO CON ARENA (MH), CONSISTENCIA FIRME A MUY FIRME, PLASTICIDAD ALTA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA CONCHAS.                                                                                                                                                                                                                                                                                                                                                              | 15         | A               | 7     |           |     | 45             | 100.0          | 23.4              |       | T           |                    |    |    |    |  |
| 21.45 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 8          |                 |       |           |     |                |                |                   |       | S           |                    |    |    |    |  |
| 22.50 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 16         | A               | 9     |           |     |                | 45             | 100.0             | 14.6  |             | T                  |    |    |    |  |
| 22.95 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 8          |                 |       |           |     |                |                |                   |       | S           |                    |    |    |    |  |
| 23.50 |       |         | 23.50m.-24.00m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2), RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 18mm SUBREDONDEADOS, DE COLOR CHOCOLATE, GRISES, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE GRISÁCEO. ESPACIAMIENTO (0.20-0.60m), ROCA FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 10°, PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA. | 1          | R               |       |           | 100 | 50             | 100            |                   |       | D           |                    |    |    |    |  |
| 24.00 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             |                    |    |    |    |  |
| 24.55 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2          | R               |       | 170.3     | 100 | 150            | 100            |                   |       |             | D                  |    |    |    |  |
| 25.50 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             |                    |    |    |    |  |
| 26.70 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3          | R               |       | 199.2     | 100 | 150            | 100            |                   |       |             | D                  |    |    |    |  |
| 27.00 |       |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                 |       |           |     |                |                |                   |       |             |                    |    |    |    |  |
|       |       |         | 24.00m.-29.10m.: ROCA SANA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA...                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |            |                 |       |           |     |                |                |                   |       |             |                    |    |    |    |  |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante  
RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



|               |                                     |           |        |           |   |    |   |              |                   |
|---------------|-------------------------------------|-----------|--------|-----------|---|----|---|--------------|-------------------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 4      | HOJA No.: | 4 | DE | 4 | PERFORADORA: | 10-25             |
| PROYECTO :    | CAVAROSA                            |           |        |           |   |    |   |              |                   |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |        |           |   |    |   |              |                   |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |        |           |   |    |   | FECHA:       | MARZO 01/04, 2024 |
| COORDENADAS:  | 658993                              | E         | 988447 | N         |   |    |   |              |                   |

|                                  |                                    |
|----------------------------------|------------------------------------|
| <b>ABREVIATURAS:</b>             | RQD - Índice de Calidad de la Roca |
| A - Alterada                     | S - Saca Muestras Partido          |
| I - Inalterada                   | P - Posteador                      |
| R - Roca                         | qu - Compresión Simple             |
| T - Broca Tricono                |                                    |
| HW - Con el Peso del Martillo    |                                    |
| C - Doble Tubo Broca de Carbuco  |                                    |
| D - Doble Tubo Broca de Diamante |                                    |

RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



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FUNDADA  
EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                   |       |  |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|-------------------|-------|--|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 5 | HOJA No.: | 1      | DE | 4      | PERFORADORA:      | 10-32 |  |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                   |       |  |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                   |       |  |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | MARZO 01/02, 2024 |       |  |
| COORDENADAS:  | 659017                              |           |   | E         | 988449 |    |        | N                 |       |  |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                        | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | N SPT<br>% HUMEDAD |    |    |    |
|-------|-------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|--------------------|----|----|----|
| *     |       |         |                                                                                                                                                                                                                 |            |                 |       |           |     |                |                |                   |       |             | 20                 | 40 | 60 | 80 |
| 0.00  |       |         | RELLENO COMPUESTO POR LIMO CON GRAVAS DE HASTA 0.02m SUBANGULARES, CONSISTENCIA MEDIANAMENTE FIRME A FIRME, PLASTICIDAD BAJA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR CHOCOLATE CLARO. ESTRUCTURA HETEROGÉNEA. |            |                 |       |           |     |                |                |                   |       | T           |                    |    |    |    |
| 0.60  |       |         |                                                                                                                                                                                                                 | 1          | A               | 7     |           |     | 45             | 100.0          | 13.3              |       | S           |                    |    |    |    |
| 1.05  |       |         |                                                                                                                                                                                                                 |            |                 | 4     |           |     |                |                |                   |       |             |                    |    |    |    |
| 1.50  |       |         |                                                                                                                                                                                                                 | 2          | A               | 3     |           |     | 45             | 100.0          | 14.0              |       | S           |                    |    |    |    |
| 1.95  |       |         |                                                                                                                                                                                                                 |            |                 | 4     |           |     |                |                |                   |       |             |                    |    |    |    |
| 3.00  |       |         |                                                                                                                                                                                                                 | 3          | A               | 3     |           |     | 45             | 55.6           | 10.0              |       | S           |                    |    |    |    |
| 3.45  |       |         |                                                                                                                                                                                                                 |            |                 | 4     |           |     |                |                |                   |       |             |                    |    |    |    |
| 4.50  |       |         |                                                                                                                                                                                                                 | 4          | A               | 2     |           |     | 45             | 77.8           | 12.3              |       | S           |                    |    |    |    |
| 4.55  |       |         |                                                                                                                                                                                                                 |            |                 | 5     |           |     |                |                |                   |       |             |                    |    |    |    |
| 6.00  |       |         |                                                                                                                                                                                                                 | 5          | A               | 6     |           |     | 45             | 100.0          | 18.0              |       | S           |                    |    |    |    |
| 6.45  |       |         |                                                                                                                                                                                                                 |            |                 | 9     |           |     |                |                |                   |       |             |                    |    |    |    |
| 7.50  |       |         |                                                                                                                                                                                                                 | 6          | A               | 9     |           |     | 45             | 100.0          | 16.4              |       | S           |                    |    |    |    |
| 7.95  |       |         |                                                                                                                                                                                                                 |            |                 | 12    |           |     |                |                |                   |       |             |                    |    |    |    |
| 9.00  |       |         |                                                                                                                                                                                                                 |            |                 | 16    |           |     |                |                |                   |       |             |                    |    |    |    |
| 9.45  |       |         | 7                                                                                                                                                                                                               | A          | 9               |       |           | 45  | 100.0          | 18.6           |                   | S     |             |                    |    |    |    |
|       |       |         |                                                                                                                                                                                                                 |            | 11              |       |           |     |                |                |                   |       |             |                    |    |    |    |
|       |       |         |                                                                                                                                                                                                                 |            | 13              |       |           |     |                |                |                   |       |             |                    |    |    |    |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Indice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

**OBSERVACIONES:**  
NF: NO SE OBSERVÓ  
PERFORADOR: A. NIETO  
DESCRIPCION / DIBUJO: A. HERNÁNDEZ

GEÓLOGO: A. HERNÁNDEZ



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UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |   |    |        |                   |       |
|---------------|-------------------------------------|-----------|---|-----------|---|----|--------|-------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 5 | HOJA No.: | 2 | DE | 4      | PERFORADORA:      | 10-32 |
| PROYECTO :    | CAVAROSA                            |           |   |           |   |    |        |                   |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |   |    |        |                   |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |   |    | FECHA: | MARZO 01/02, 2024 |       |
| COORDENADAS:  | 659017 E                            |           |   | 988449 N  |   |    |        |                   |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL                                                                                                                                                                                           | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA | N SPT | % HUMEDAD |    |    |
|-------|-------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|-------|-----------|----|----|
| *     |       |         |                                                                                                                                                                                                                    |            |                 |       |           |     |                |                |                   |       |             |       |           |    |    |
|       |       |         |                                                                                                                                                                                                                    |            |                 |       |           |     |                |                |                   |       |             | 20    | 40        | 60 | 80 |
| 10.50 |       |         | LIMO ELÁSTICO ARENOSO CON GRAVAS DE HASTA 0.01m SUBANGULARES, CONSISTENCIA FIRME A DURA, PLASTICIDAD MEDIA, CONTENIDO NATURAL DE HUMEDAD MEDIA A BAJA, COLOR CHOCOLATE A GRIS CHOCOLATOSO. ESTRUCTURA HETEROGÉNEA. | 8          | A               | 9     |           |     |                |                |                   |       | T           |       |           |    |    |
| 10.95 |       |         |                                                                                                                                                                                                                    |            |                 | 3     |           |     | 45             | 22.2           | 40.2              |       | S           | ●     | ■         |    |    |
| 12.00 |       |         |                                                                                                                                                                                                                    |            |                 | 3     |           |     |                |                |                   |       | T           |       |           |    |    |
| 12.45 |       |         |                                                                                                                                                                                                                    |            |                 | 6     |           |     | 20             | 175.0          | 23.2              |       | S           | ●     | ■         |    |    |
| 12.90 |       |         |                                                                                                                                                                                                                    |            |                 | 9     |           |     |                |                |                   |       | T           |       |           |    |    |
| 13.50 |       |         |                                                                                                                                                                                                                    | 10         | A               | 5     |           |     | 45             | 100.0          | 27.3              |       | S           | ●     | ■         |    |    |
| 13.95 |       |         |                                                                                                                                                                                                                    |            | 7               |       |           |     |                |                |                   |       |             |       |           |    |    |
| 15.00 |       |         |                                                                                                                                                                                                                    |            | 6               |       |           |     |                |                |                   |       | T           |       |           |    |    |
| 15.10 |       |         |                                                                                                                                                                                                                    | 11         | A               | 50    |           |     | 10             | 100.0          | 17.5              |       | S           | ■     | ●         |    |    |
| 16.50 |       |         | BOULDERS                                                                                                                                                                                                           | 12         | A               | 9     |           |     |                |                |                   |       | T           |       |           |    |    |
| 16.95 |       |         | ARENA LIMOSA DE GRANO FINO, COMPACIDAD SUELTA A FIRME, PLASTICIDAD MEDIA, CONTENIDO NATURAL DE HUMEDAD BAJA, COLOR GRIS OSCURO. ESTRUCTURA HOMOGÉNEA. PRESENTA ABUNDANTES CONCHAS.                                 |            |                 | 3     |           |     | 45             | 100.0          | 17.6              |       | S           | ●     | ■         |    |    |
| 18.00 |       |         |                                                                                                                                                                                                                    |            |                 | 5     |           |     |                |                |                   |       |             |       |           |    |    |
| 18.90 |       |         |                                                                                                                                                                                                                    |            | 1               | I     |           |     | 90             | 94.0           |                   |       | SH          |       |           |    |    |
| 19.50 |       |         |                                                                                                                                                                                                                    |            | 13              | A     | 7         |     |                |                |                   |       |             |       |           |    |    |
| 19.95 |       |         |                                                                                                                                                                                                                    |            |                 | 6     |           |     | 45             | 100.0          | 22.6              |       | S           | ●     | ■         |    |    |

**ABREVIATURAS:**  
A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

## PERFIL DE PERFORACION

|               |                                     |           |   |           |        |    |        |                   |       |
|---------------|-------------------------------------|-----------|---|-----------|--------|----|--------|-------------------|-------|
| TRABAJO No.:  | 2-1259                              | HOYO No.: | 5 | HOJA No.: | 3      | DE | 4      | PERFORADORA:      | 10-32 |
| PROYECTO :    | CAVAROSA                            |           |   |           |        |    |        |                   |       |
| LOCALIZACION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ |           |   |           |        |    |        |                   |       |
| CLIENTE :     | SFERA PROPERTIES CORP               |           |   |           |        |    | FECHA: | MARZO 01/02, 2024 |       |
| COORDENADAS:  | 659017                              |           |   | E         | 988449 |    |        | N                 |       |

| PROF. | ELEV. | SIMBOLO | DESCRIPCION DEL MATERIAL | MUESTRA N° | TIPO DE MUESTRA | N SPT | qu kg/cm² | RQD | PENETRACIÓN cm | % RECUPERACION | % HUMEDAD NATURAL | FORRO | HERRAMIENTA |  |
|-------|-------|---------|--------------------------|------------|-----------------|-------|-----------|-----|----------------|----------------|-------------------|-------|-------------|--|
| *     |       |         |                          |            |                 |       |           |     |                |                |                   |       |             |  |
| 21.00 |       |         |                          | 14         | A               | 2     |           |     |                |                |                   |       | T           |  |
| 21.45 |       |         |                          |            |                 | 1     |           |     | 45             | 88.9           | 34.2              |       | S           |  |
| 22.50 |       |         |                          | 15         | A               | 2     |           |     |                |                |                   |       | T           |  |
| 22.95 |       |         |                          |            |                 | 1     |           |     | 45             | 100.0          | 22.1              |       | S           |  |
| 23.74 |       |         |                          |            |                 |       |           |     |                |                |                   |       |             |  |
| 24.00 |       |         |                          | 1          | R               |       |           | 100 | 26             | 100            |                   |       | D           |  |
| 24.30 |       |         |                          | 2          | R               |       |           | 100 | 150            | 100            |                   |       | D           |  |
| 25.50 |       |         |                          | 3          | R               |       |           | 100 | 150            | 100            |                   |       | D           |  |
| 27.00 |       |         |                          |            |                 |       |           |     |                |                |                   |       |             |  |
| 27.25 |       |         |                          |            |                 |       |           |     |                |                |                   |       |             |  |

ABREVIATURAS:

A - Alterada  
I - Inalterada  
R - Roca  
T - Broca Tricono  
HW - Con el Peso del Martillo  
C - Doble Tubo Broca de Carburo  
D - Doble Tubo Broca de Diamante

RQD - Índice de Calidad de la Roca  
S - Saca Muestras Partido  
P - Posteador  
qu - Compresión Simple

● N SPT  
■ % HUMEDAD

20 40 60 80

## PERFIL DE PERFORACION

[illegible]

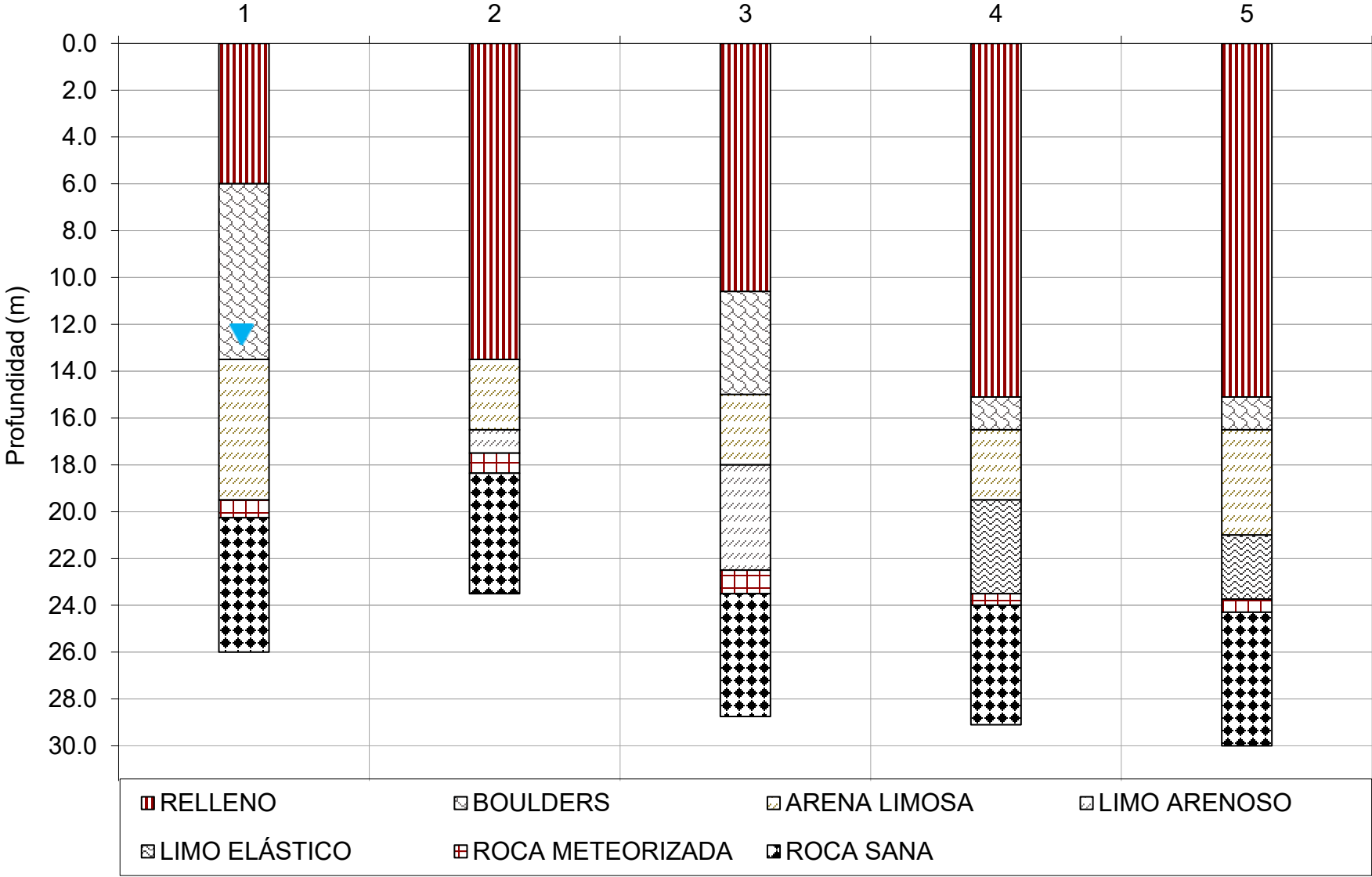


**APENDICE J**  
**ESTRATIGRAFIA**

**TECNILAB, S. A.**

Proyecto: CAVAROSA  
Cliente: SFERA PROPERTIES CORP  
Trabajo No.: 2-1259 Fecha: MARZO, 2024

Hoyo No.





**APENDICE K**  
**DATOS SOBRE TESTIGOS DE ROCA**

### DATOS SOBRE TESTIGOS DE ROCA

TRABAJO NO.: 2-1259

HOYO No.: 1

HOJA No.: 1 DE 1

BROCA TAMAÑO: HQ

PROYECTO: CAVAROSA

LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ

FECHA: FEBRERO 10/17, 2024

CLIENTE: SFERA PROPERTIES CORP

ELEVACION (m): --

COORDENADAS: 658972 E 988495 N

[illegible]

19.50m.-20.26m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2). RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 14mm SUBREDONDEADOS, DE COLOR CHOCOLATE, GRISES, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE. ESPACIAMIENTO (0.60-2.00m), ROCA POCO FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 10", PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA.

20.26m.-26.00m.: ROCA SANA, CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: MODERADAMENTE SUAVE (RH-2), RESISTENCIA DÉBIL, ROCA DE TEXTURA CLÁSICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 30mm SUBREDONDEADOS, DE COLOR GRIS, VERDOSOS, MATRIZ DE GRANO FINO DE COLOR GRIS CLARO. ESPACIAMIENTO (>2.00m), ROCA SIN FRACTURAS. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS, PLANAS, RUGOSAS, LIMPIAS Y CERRADAS (1-3mm). CON CALCITA DE RELLENO.

**OBSERVACIONES:**

RQD: 0-25 Muy mala  
26-50 Mala  
51-75 Regular  
76-90 Buena  
91-100 Excelente

TESTIGO DE ROCA PARA ENSAYO



Dibujado por: A. HERNÁNDEZ

Geólogo: A. HERNÁNDEZ

Perforador: J. CEDEÑO

### DATOS SOBRE TESTIGOS DE ROCA

TRABAJO NO.: 2-1259

HOYO No.: 2

HOJA No.: 1 DE 1

BROCA TAMAÑO: HQ

PROYECTO: CAVAROSA

LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ

FECHA: FEBRERO 19/23, 2024

CLIENTE: SFERA PROPERTIES CORP

ELEVACION (m): --

COORDENADAS: 658977 E 988478 N

[illegible]

### DATOS SOBRE TESTIGOS DE ROCA

TRABAJO NO.: 2-1259

HOYO No.: 3

HOJA No.: 1 DE 1

BROCA TAMAÑO: HQ

PROYECTO: CAVAROSA

LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ.

FECHA: FEBRERO 26/27, 2024

CLIENTE: SFERA PROPERTIES CORP

ELEVACION (m): --

COORDENADAS: 658977 E 988461 N

[illegible]

10.60m.-11.82m.: BOULDERS, DE COLOR GRIS CLARO A OSCURO, TAMAÑOS MÁXIMOS DE 10cm, CON OXIDACIÓN LIMÓNICA

11.82m.-12.00m.: BLOQUE DE CONGLOMERADO, DE COLOR GRIS OSCURO, RESISTENCIA DÉBIL.

12.00m.-13.50m.: BOULDERS. ARENISCAS DE GRANO FINO A GRUESO, ESTRUCTURA GRADADA A CEMENTADA, DE COLOR GRIS CLARO. TAMAÑOS MÁXIMOS DE 10cm. RESISTENCIA MUY DÉBIL.

22.50m.-23.25m.: ROCA MODERADAMENTE METEORIZADA. CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: SUAVE A MODERADAMENTE SUAVE (RH-1 A RH-2), RESISTENCIA MUY DÉBIL A DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 15mm SUBREDONDEADOS, DE COLOR CHOCOLATE, ANARANJADOS, VIOLÁCEOS, MATRIZ DE GRANO FINO DE COLOR CHOCOLATE. ESPACIAMIENTO (0.60-2.00m), ROCA POCO FRACTURADA. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS Y DIACLASAS DE 10", PLANAS, RUGOSAS Y CERRADAS (1-3mm). CON ÓXIDOS DE LIMONITA.

23.25m.-28.50m.: ROCA SANA, CONGLOMERADO, CON LEVE CIRCULACIÓN DE AGUA. DUREZA: MODERADAMENTE SUAVE (RH-2), RESISTENCIA DÉBIL, ROCA DE TEXTURA CLÁSTICA, ESTRUCTURA MASIVA, CON CLASTOS DE HASTA 20mm SUBREDONDEADOS, DE COLOR GRIS, VIOLÁCEOS, NEGROS, MATRIZ DE GRANO FINO DE COLOR GRIS CLARO. ESPESIAMIENTO (>2.00m). ROCA SIN FRACTURAS. TIPOS DE DISCONTINUIDADES, FRACTURAS MECÁNICAS, PLANAS, RUGOSAS, LIMPIAS Y CERRADAS (1-3mm). CON CALCITA DE RELLENO.

**OBSERVACIONES:**

RQD: 0-25 Muy mala  
26-50 Mala  
51-75 Regular  
76-90 Buena  
91-100 Excelente

TESTIGO DE ROCA PARA ENSAYO



Dibujado por: A. HERNÁNDEZ

Geólogo: A. HERNÁNDEZ

Perforador: A. NIETO

### DATOS SOBRE TESTIGOS DE ROCA

TRABAJO NO.: 2-1259

HOYO No.: 4

HOJA No.: 1 DE 1

BROCA TAMAÑO: HQ

PROYECTO: CAVAROSA

LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ.

FECHA: MARZO 01/04, 2024

CLIENTE: SFERA PROPERTIES CORP

ELEVACION (m): --

COORDENADAS: 658993 E 988447 N

[illegible]

### DATOS SOBRE TESTIGOS DE ROCA

TRABAJO NO.: 2-1259

HOYO No.: 5

HOJA No.: 1 DE 1

BROCA TAMAÑO: HQ

PROYECTO: CAVAROSA

LOCALIZACION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ

FECHA: MARZO 01/02, 2024

CLIENTE: SFERA PROPERTIES CORP

ELEVACION (m): --

COORDENADAS: 659017 E 988449 N

[illegible]



**APENDICE L**  
**ENSAYO PRESIOMETRICO**

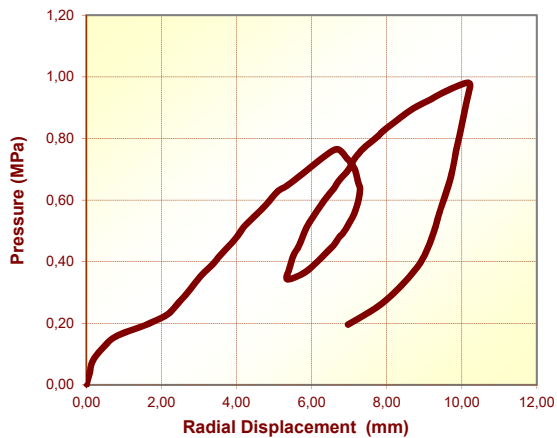
**TECNILAB, S. A.**

|             |                          |                      |                        |                    |
|-------------|--------------------------|----------------------|------------------------|--------------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.        |                    |
| Borehole :  | 2                        | Depth :              | 15,12m                 | Water Level : 7,5m |
| Project :   | Proyecto CAVAROSA        |                      | Test date : 26/02/2024 |                    |
| Lithology : | Suelo                    | Pressuremeter Probe: | OYO ELASTMETER-2       |                    |
| Comments :  | Packer: 14,86m a 15,38m. |                      |                        |                    |

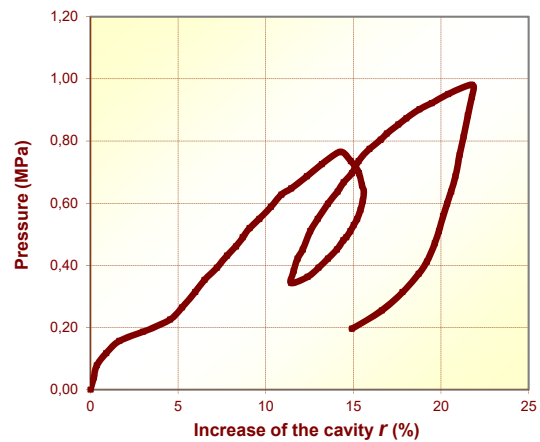
**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**RAW DATA**

| Line | PRESSURE<br>(RAW DATA) | PRESSURE<br>(CORRECTED) | RADIAL DISPLACEMENT (mm) |  |  |  | r (CORRECTED)<br>(mm) |
|------|------------------------|-------------------------|--------------------------|--|--|--|-----------------------|
|      | (MPa)                  | (MPa)                   |                          |  |  |  |                       |
| 1    | 0,00                   | 0,000                   | 0,00                     |  |  |  | 0,000                 |
| 2    | 0,23                   | 0,203                   | 2,12                     |  |  |  | 2,117                 |
| 3    | 0,26                   | 0,231                   | 2,44                     |  |  |  | 2,437                 |
| 4    | 0,35                   | 0,297                   | 3,04                     |  |  |  | 3,036                 |
| 5    | 0,43                   | 0,354                   | 3,64                     |  |  |  | 3,636                 |
| 6    | 0,49                   | 0,398                   | 4,06                     |  |  |  | 4,055                 |
| 7    | 0,55                   | 0,441                   | 4,50                     |  |  |  | 4,494                 |
| 8    | 0,63                   | 0,499                   | 5,09                     |  |  |  | 5,084                 |
| 9    | 0,69                   | 0,533                   | 5,77                     |  |  |  | 5,763                 |
| 10   | 0,76                   | 0,580                   | 6,66                     |  |  |  | 6,653                 |
| 11   | 0,74                   | 0,540                   | 6,94                     |  |  |  | 6,933                 |
| 12   | 0,70                   | 0,493                   | 7,16                     |  |  |  | 7,154                 |
| 13   | 0,64                   | 0,430                   | 7,29                     |  |  |  | 7,285                 |
| 14   | 0,58                   | 0,374                   | 7,20                     |  |  |  | 7,195                 |
| 15   | 0,53                   | 0,331                   | 7,02                     |  |  |  | 7,016                 |
| 16   | 0,49                   | 0,299                   | 6,82                     |  |  |  | 6,816                 |
| 17   | 0,45                   | 0,269                   | 6,57                     |  |  |  | 6,567                 |
| 18   | 0,39                   | 0,228                   | 6,08                     |  |  |  | 6,077                 |
| 19   | 0,34                   | 0,205                   | 5,35                     |  |  |  | 5,347                 |
| 20   | 0,42                   | 0,277                   | 5,52                     |  |  |  | 5,517                 |
| 21   | 0,45                   | 0,302                   | 5,66                     |  |  |  | 5,656                 |
| 22   | 0,51                   | 0,353                   | 5,86                     |  |  |  | 5,856                 |
| 23   | 0,55                   | 0,385                   | 6,06                     |  |  |  | 6,055                 |
| 24   | 0,64                   | 0,455                   | 6,59                     |  |  |  | 6,584                 |
| 25   | 0,70                   | 0,500                   | 6,97                     |  |  |  | 6,964                 |
| 26   | 0,77                   | 0,562                   | 7,44                     |  |  |  | 7,433                 |
| 27   | 0,82                   | 0,594                   | 7,90                     |  |  |  | 7,893                 |
| 28   | 0,87                   | 0,625                   | 8,42                     |  |  |  | 8,412                 |
| 29   | 0,92                   | 0,659                   | 9,10                     |  |  |  | 9,092                 |
| 30   | 0,98                   | 0,690                   | 10,17                    |  |  |  | 10,161                |

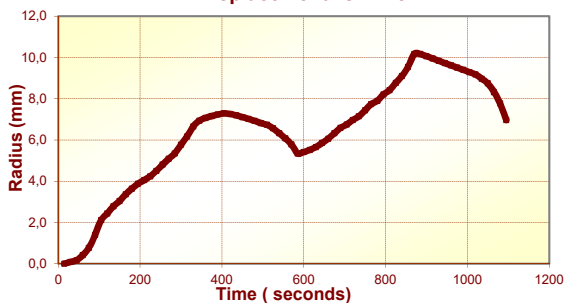
**Pressuremeter Curve**



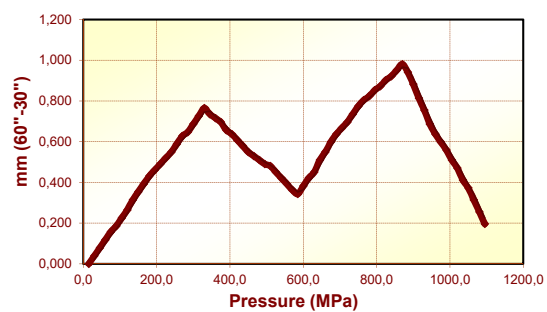
**Pressuremeter Curve**



**Displacement vs Time**



**Pressure vs Time**



|             |                          |                      |                        |                    |
|-------------|--------------------------|----------------------|------------------------|--------------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.        |                    |
| Borehole :  | 2                        | Depth :              | 15,12m                 | Water Level : 7,5m |
| Project :   | Proyecto CAVAROSA        |                      | Test date : 26/02/2024 |                    |
| Lithology : | Suelo                    | Pressuremeter Probe: | OYO ELASTMETER-2       |                    |
| Comments :  | Packer: 14,86m a 15,38m. | N° Packer            | P22                    |                    |

**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012  
INTERPRETATION**

| Initial Modulus Analysis  |        |       |     |
|---------------------------|--------|-------|-----|
| Poisson's Ratio $\nu$     | 0,30   |       |     |
| Radius of the packer (R0) | 46,732 | mm    |     |
| $\Delta P$                | $P_1$  | 0,20  | MPa |
|                           | $P_2$  | 0,58  | MPa |
| $\Delta r$                | $r_1$  | 2,117 | mm  |
|                           | $r_2$  | 6,653 | mm  |

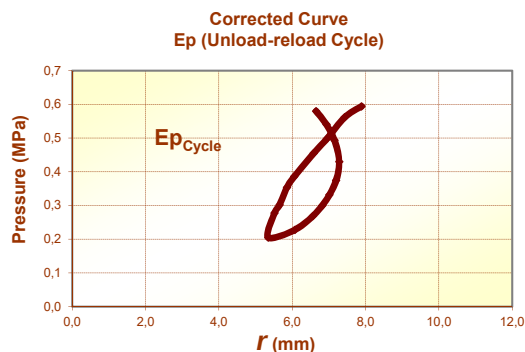
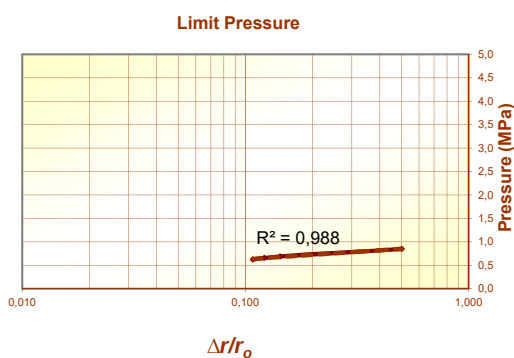
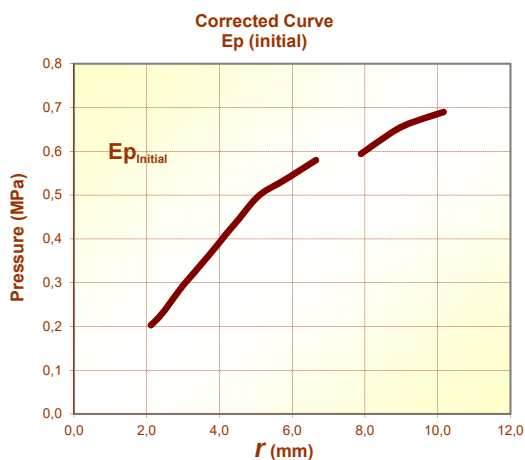
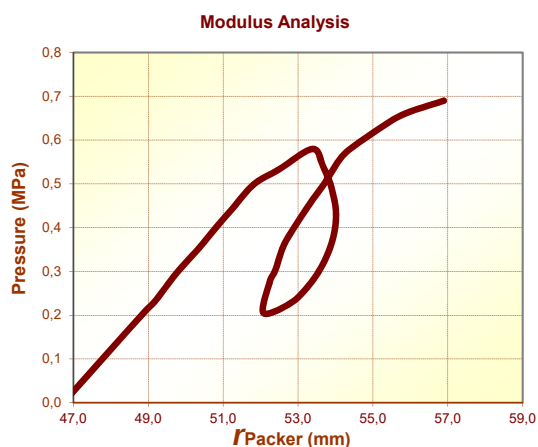
|                         |   |   |     |
|-------------------------|---|---|-----|
| $E_{p \text{ initial}}$ | = | 6 | MPa |
| $G_{p \text{ initial}}$ | = | 2 | MPa |

| Unload-Reload Modulus Analysis |       |       |     |
|--------------------------------|-------|-------|-----|
| $\Delta P$                     | $P_1$ | 0,20  | MPa |
|                                | $P_2$ | 0,56  | MPa |
| $\Delta r$                     | $r_1$ | 5,347 | mm  |
|                                | $r_2$ | 7,433 | mm  |

|                       |   |    |     |
|-----------------------|---|----|-----|
| $E_{p \text{ cycle}}$ | = | 12 | MPa |
| $G_{p \text{ cycle}}$ | = | 5  | MPa |

|                |          |
|----------------|----------|
| Yield Pressure | 0,40 MPa |
| Limit Pressure | 0,65 MPa |
| P0 =           | 0,20 MPa |

| Line | PRESSURE<br>(CORRECTED)<br>(MPa) | $r$<br>(CORRECTED)<br>(mm) | $r_{\text{Packer}}$<br>(mm) |
|------|----------------------------------|----------------------------|-----------------------------|
| 1    | 0,00                             | 0,000                      | 46,732                      |
| 2    | 0,20                             | 2,117                      | 48,849                      |
| 3    | 0,23                             | 2,437                      | 49,169                      |
| 4    | 0,30                             | 3,036                      | 49,768                      |
| 5    | 0,35                             | 3,636                      | 50,368                      |
| 6    | 0,40                             | 4,055                      | 50,787                      |
| 7    | 0,44                             | 4,494                      | 51,226                      |
| 8    | 0,50                             | 5,084                      | 51,816                      |
| 9    | 0,53                             | 5,763                      | 52,495                      |
| 10   | 0,58                             | 6,653                      | 53,385                      |
| 11   | 0,54                             | 6,933                      | 53,665                      |
| 12   | 0,49                             | 7,154                      | 53,886                      |
| 13   | 0,43                             | 7,285                      | 54,017                      |
| 14   | 0,37                             | 7,195                      | 53,927                      |
| 15   | 0,33                             | 7,016                      | 53,748                      |
| 16   | 0,30                             | 6,816                      | 53,548                      |
| 17   | 0,27                             | 6,567                      | 53,299                      |
| 18   | 0,23                             | 6,077                      | 52,809                      |
| 19   | 0,20                             | 5,347                      | 52,079                      |
| 20   | 0,28                             | 5,517                      | 52,249                      |
| 21   | 0,30                             | 5,656                      | 52,388                      |
| 22   | 0,35                             | 5,856                      | 52,588                      |
| 23   | 0,39                             | 6,055                      | 52,787                      |
| 24   | 0,45                             | 6,584                      | 53,316                      |
| 25   | 0,50                             | 6,964                      | 53,696                      |
| 26   | 0,56                             | 7,433                      | 54,165                      |
| 27   | 0,59                             | 7,893                      | 54,625                      |
| 28   | 0,62                             | 8,412                      | 55,144                      |
| 29   | 0,66                             | 9,092                      | 55,824                      |
| 30   | 0,69                             | 10,161                     | 56,893                      |

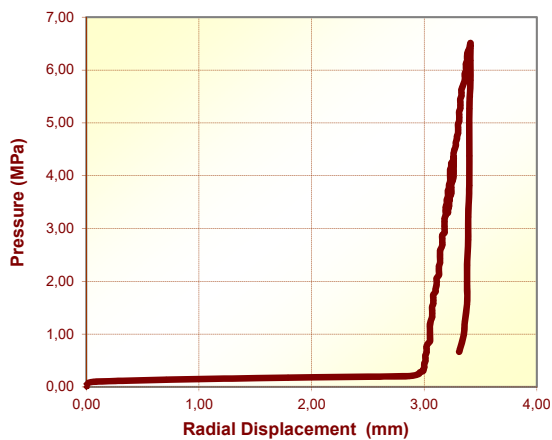


|             |                          |                      |                  |               |            |
|-------------|--------------------------|----------------------|------------------|---------------|------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.  |               |            |
| Borehole :  | 2                        | Depth :              | 17,96m           | Water Level : | 7,5m       |
| Project :   | Proyecto CAVAROSA        |                      |                  | Test date :   | 26/02/2024 |
| Lithology : | Roca meteorizada         | Pressuremeter Probe: | OYO ELASTMETER-2 |               |            |
| Comments :  | Packer: 17,70m a 18,22m. |                      |                  |               |            |

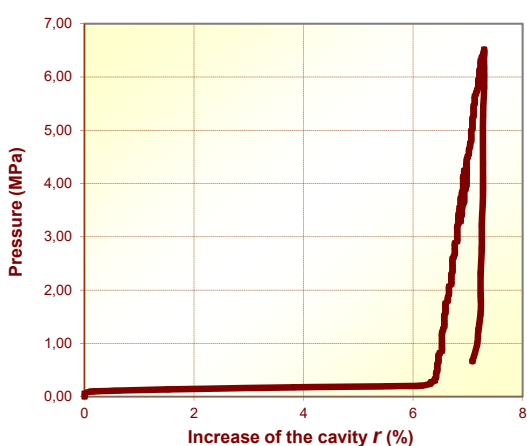
**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**RAW DATA**

| Line | PRESSURE<br>(RAW DATA) | PRESSURE<br>(CORRECTED) | RADIAL DISPLACEMENT (mm) |  |  |  | r (CORRECTED)<br>(mm) |
|------|------------------------|-------------------------|--------------------------|--|--|--|-----------------------|
|      | (MPa)                  | (MPa)                   |                          |  |  |  |                       |
| 1    | 0,00                   | 0,000                   | 0,00                     |  |  |  | 0,000                 |
| 2    | 0,25                   | 0,193                   | 2,94                     |  |  |  | 2,938                 |
| 3    | 0,30                   | 0,250                   | 2,99                     |  |  |  | 2,987                 |
| 4    | 0,73                   | 0,671                   | 3,02                     |  |  |  | 3,012                 |
| 5    | 1,19                   | 1,131                   | 3,05                     |  |  |  | 3,036                 |
| 6    | 1,70                   | 1,639                   | 3,08                     |  |  |  | 3,060                 |
| 7    | 2,18                   | 2,118                   | 3,13                     |  |  |  | 3,104                 |
| 8    | 2,43                   | 2,373                   | 3,14                     |  |  |  | 3,110                 |
| 9    | 2,69                   | 2,627                   | 3,16                     |  |  |  | 3,127                 |
| 10   | 2,92                   | 2,862                   | 3,18                     |  |  |  | 3,144                 |
| 11   | 3,19                   | 3,127                   | 3,18                     |  |  |  | 3,141                 |
| 12   | 3,40                   | 3,342                   | 3,19                     |  |  |  | 3,148                 |
| 13   | 3,67                   | 3,606                   | 3,21                     |  |  |  | 3,165                 |
| 14   | 3,89                   | 3,831                   | 3,23                     |  |  |  | 3,182                 |
| 15   | 4,09                   | 4,027                   | 3,23                     |  |  |  | 3,180                 |
| 16   | 4,30                   | 4,232                   | 3,26                     |  |  |  | 3,207                 |
| 17   | 4,28                   | 4,212                   | 3,26                     |  |  |  | 3,207                 |
| 18   | 4,04                   | 3,978                   | 3,24                     |  |  |  | 3,190                 |
| 19   | 3,81                   | 3,752                   | 3,23                     |  |  |  | 3,183                 |
| 20   | 3,58                   | 3,517                   | 3,22                     |  |  |  | 3,176                 |
| 21   | 3,37                   | 3,312                   | 3,21                     |  |  |  | 3,169                 |
| 22   | 3,47                   | 3,410                   | 3,21                     |  |  |  | 3,167                 |
| 23   | 3,57                   | 3,508                   | 3,22                     |  |  |  | 3,176                 |
| 24   | 3,67                   | 3,605                   | 3,24                     |  |  |  | 3,195                 |
| 25   | 3,98                   | 3,918                   | 3,26                     |  |  |  | 3,211                 |
| 26   | 4,57                   | 4,506                   | 3,28                     |  |  |  | 3,224                 |
| 27   | 5,03                   | 4,966                   | 3,31                     |  |  |  | 3,248                 |
| 28   | 5,51                   | 5,445                   | 3,33                     |  |  |  | 3,262                 |
| 29   | 5,99                   | 5,924                   | 3,37                     |  |  |  | 3,296                 |
| 30   | 6,51                   | 6,442                   | 3,42                     |  |  |  | 3,339                 |

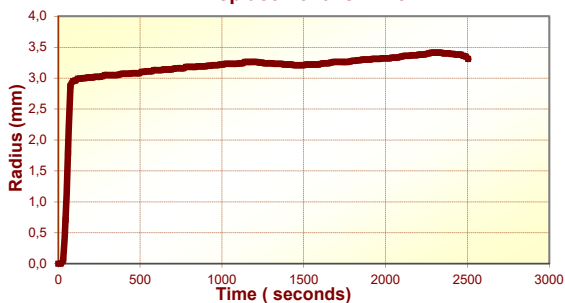
**Pressuremeter Curve**



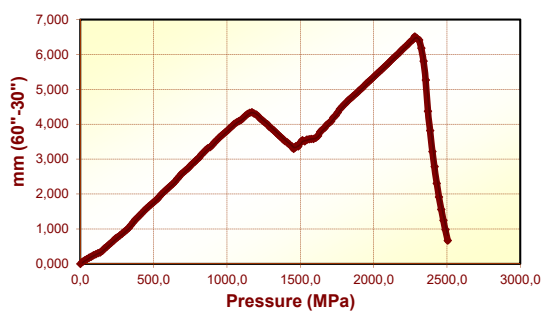
**Pressuremeter Curve**



**Displacement vs Time**



**Pressure vs Time**



|             |                          |                      |                  |                        |
|-------------|--------------------------|----------------------|------------------|------------------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.  |                        |
| Borehole :  | 2                        | Depth :              | 17,96m           | Water Level : 7,5m     |
| Project :   | Proyecto CAVAROSA        |                      |                  | Test date : 26/02/2024 |
| Lithology : | Roca meteorizada         | Pressuremeter Probe: | OYO ELASTMETER-2 |                        |
| Comments :  | Packer: 17,70m a 18,22m. | N° Packer            | P22              |                        |

**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**INTERPRETATION**

| Initial Modulus Analysis       |        |       |     |
|--------------------------------|--------|-------|-----|
| Poisson's Ratio $\nu$          | 0,30   |       |     |
| Radius of the packer ( $R_0$ ) | 46,732 | mm    |     |
| $\Delta P$                     | $P_1$  | 0,19  | MPa |
|                                | $P_2$  | 5,92  | MPa |
| $\Delta r$                     | $r_1$  | 2,938 | mm  |
|                                | $r_2$  | 3,296 | mm  |

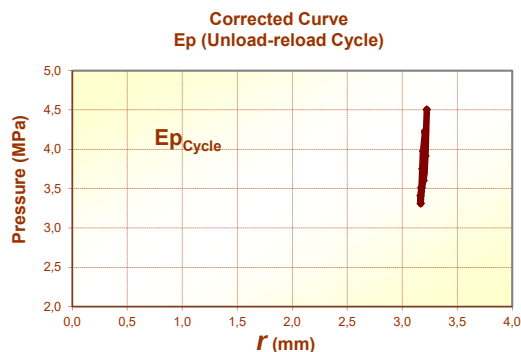
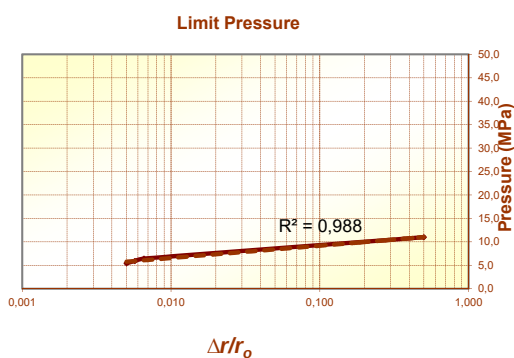
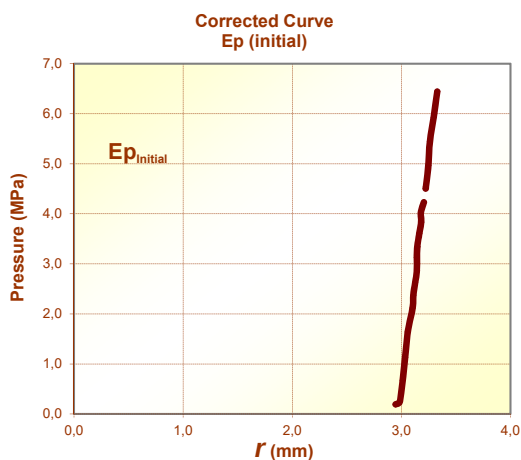
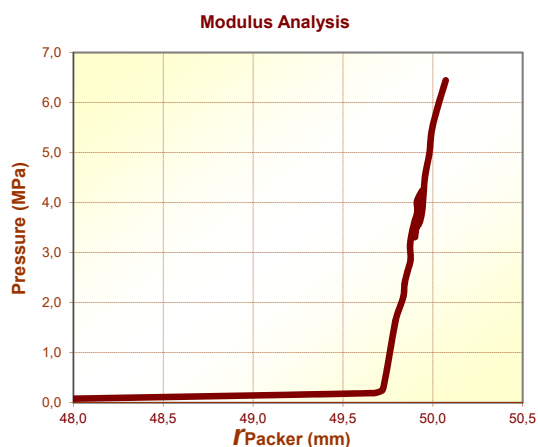
|               |   |      |     |
|---------------|---|------|-----|
| $E_p$ Initial | = | 1036 | MPa |
| $G_p$ Initial | = | 399  | MPa |

| Unload-Reload Modulus Analysis |       |       |     |
|--------------------------------|-------|-------|-----|
| $\Delta P$                     | $P_1$ | 3,31  | MPa |
|                                | $P_2$ | 4,51  | MPa |
| $\Delta r$                     | $r_1$ | 3,169 | mm  |
|                                | $r_2$ | 3,224 | mm  |

|             |   |      |     |
|-------------|---|------|-----|
| $E_p$ cycle | = | 1407 | MPa |
| $G_p$ cycle | = | 541  | MPa |

|                |           |
|----------------|-----------|
| Yield Pressure | 5,70 MPa  |
| Limit Pressure | 10,80 MPa |
| P0 =           | 0,19 MPa  |

| Line | PRESSURE<br>(CORRECTED)<br>(MPa) | $r$<br>(CORRECTED)<br>(mm) | $r$ Packer<br>(mm) |
|------|----------------------------------|----------------------------|--------------------|
| 1    | 0,00                             | 0,000                      | 46,732             |
| 2    | 0,19                             | 2,938                      | 49,670             |
| 3    | 0,25                             | 2,987                      | 49,719             |
| 4    | 0,67                             | 3,012                      | 49,744             |
| 5    | 1,13                             | 3,036                      | 49,768             |
| 6    | 1,64                             | 3,060                      | 49,792             |
| 7    | 2,12                             | 3,104                      | 49,836             |
| 8    | 2,37                             | 3,110                      | 49,842             |
| 9    | 2,63                             | 3,127                      | 49,859             |
| 10   | 2,86                             | 3,144                      | 49,876             |
| 11   | 3,13                             | 3,141                      | 49,873             |
| 12   | 3,34                             | 3,148                      | 49,880             |
| 13   | 3,61                             | 3,165                      | 49,897             |
| 14   | 3,83                             | 3,182                      | 49,914             |
| 15   | 4,03                             | 3,180                      | 49,912             |
| 16   | 4,23                             | 3,207                      | 49,939             |
| 17   | 4,21                             | 3,207                      | 49,939             |
| 18   | 3,98                             | 3,190                      | 49,922             |
| 19   | 3,75                             | 3,183                      | 49,915             |
| 20   | 3,52                             | 3,176                      | 49,908             |
| 21   | 3,31                             | 3,169                      | 49,901             |
| 22   | 3,41                             | 3,167                      | 49,899             |
| 23   | 3,51                             | 3,176                      | 49,908             |
| 24   | 3,60                             | 3,195                      | 49,927             |
| 25   | 3,92                             | 3,211                      | 49,943             |
| 26   | 4,51                             | 3,224                      | 49,956             |
| 27   | 4,97                             | 3,248                      | 49,980             |
| 28   | 5,45                             | 3,262                      | 49,994             |
| 29   | 5,92                             | 3,296                      | 50,028             |
| 30   | 6,44                             | 3,339                      | 50,071             |

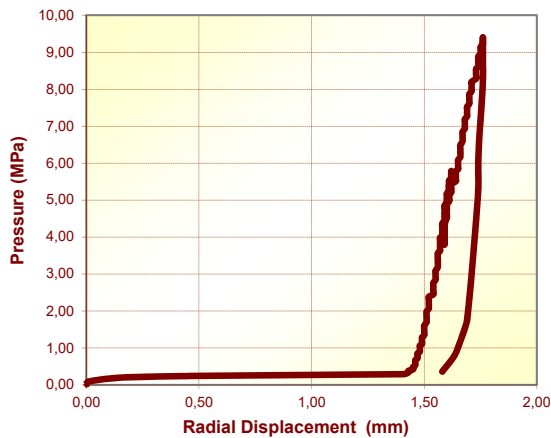


|             |                          |            |                                       |                    |
|-------------|--------------------------|------------|---------------------------------------|--------------------|
| Customer :  | TECNILAB SA              | Location : | Amador, Panamá.                       |                    |
| Borehole :  | 2                        | Depth :    | 22,62m                                | Water Level : 7,5m |
| Project :   | Proyecto CAVAROSA        |            | Test date : 26/02/2024                |                    |
| Lithology : | Roca sana                |            | Pressuremeter Probe: OYO ELASTMETER-2 |                    |
| Comments :  | Packer: 22,36m a 22,88m. |            |                                       |                    |

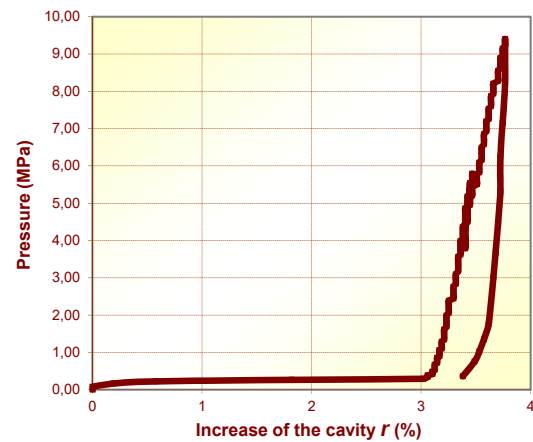
**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**RAW DATA**

| Line | PRESSURE<br>(RAW DATA) | PRESSURE<br>(CORRECTED) | RADIAL DISPLACEMENT (mm) |  |  |  | r (CORRECTED)<br>(mm) |
|------|------------------------|-------------------------|--------------------------|--|--|--|-----------------------|
|      | (MPa)                  | (MPa)                   |                          |  |  |  |                       |
| 1    | 0,00                   | 0,000                   | 0,00                     |  |  |  | 0,000                 |
| 2    | 0,42                   | 0,424                   | 1,42                     |  |  |  | 1,415                 |
| 3    | 1,01                   | 1,010                   | 1,48                     |  |  |  | 1,467                 |
| 4    | 1,54                   | 1,539                   | 1,50                     |  |  |  | 1,481                 |
| 5    | 2,24                   | 2,235                   | 1,52                     |  |  |  | 1,492                 |
| 6    | 2,93                   | 2,930                   | 1,55                     |  |  |  | 1,513                 |
| 7    | 3,73                   | 3,724                   | 1,57                     |  |  |  | 1,523                 |
| 8    | 4,36                   | 4,361                   | 1,58                     |  |  |  | 1,525                 |
| 9    | 4,64                   | 4,635                   | 1,59                     |  |  |  | 1,532                 |
| 10   | 5,00                   | 4,997                   | 1,60                     |  |  |  | 1,538                 |
| 11   | 5,26                   | 5,252                   | 1,61                     |  |  |  | 1,544                 |
| 12   | 5,49                   | 5,487                   | 1,61                     |  |  |  | 1,541                 |
| 13   | 5,79                   | 5,781                   | 1,62                     |  |  |  | 1,548                 |
| 14   | 5,61                   | 5,605                   | 1,62                     |  |  |  | 1,550                 |
| 15   | 5,32                   | 5,311                   | 1,61                     |  |  |  | 1,544                 |
| 16   | 5,00                   | 4,997                   | 1,61                     |  |  |  | 1,548                 |
| 17   | 4,69                   | 4,683                   | 1,60                     |  |  |  | 1,541                 |
| 18   | 4,34                   | 4,341                   | 1,59                     |  |  |  | 1,536                 |
| 19   | 3,99                   | 3,988                   | 1,59                     |  |  |  | 1,540                 |
| 20   | 3,85                   | 3,850                   | 1,59                     |  |  |  | 1,542                 |
| 21   | 4,58                   | 4,576                   | 1,60                     |  |  |  | 1,543                 |
| 22   | 4,96                   | 4,958                   | 1,61                     |  |  |  | 1,548                 |
| 23   | 5,32                   | 5,310                   | 1,62                     |  |  |  | 1,554                 |
| 24   | 5,68                   | 5,673                   | 1,64                     |  |  |  | 1,569                 |
| 25   | 5,88                   | 5,878                   | 1,65                     |  |  |  | 1,577                 |
| 26   | 6,68                   | 6,672                   | 1,67                     |  |  |  | 1,587                 |
| 27   | 7,35                   | 7,348                   | 1,69                     |  |  |  | 1,598                 |
| 28   | 8,03                   | 8,024                   | 1,71                     |  |  |  | 1,610                 |
| 29   | 8,71                   | 8,699                   | 1,74                     |  |  |  | 1,631                 |
| 30   | 9,39                   | 9,385                   | 1,76                     |  |  |  | 1,643                 |

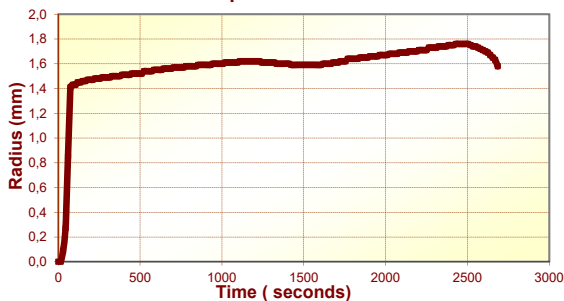
**Pressuremeter Curve**



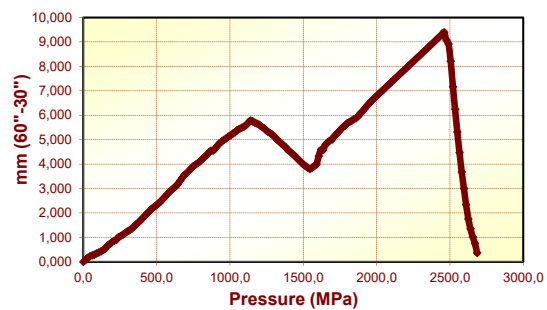
**Pressuremeter Curve**



**Displacement vs Time**



**Pressure vs Time**



|             |                          |                      |                  |
|-------------|--------------------------|----------------------|------------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.  |
| Borehole :  | 2                        | Depth :              | 22,62m           |
| Project :   | Proyecto CAVAROSA        | Water Level :        | 7,5m             |
| Lithology : | Roca sana                | Test date :          | 26/02/2024       |
| Comments :  | Packer: 22,36m a 22,88m. | Pressuremeter Probe: | OYO ELASTMETER-2 |
|             |                          | N° Packer            | P22              |

**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**INTERPRETATION**

| Initial Modulus Analysis       |        |       |     |
|--------------------------------|--------|-------|-----|
| Poisson's Ratio $\nu$          | 0,30   |       |     |
| Radius of the packer ( $R_0$ ) | 46,732 | mm    |     |
| $\Delta P$                     | $P_1$  | 0,42  | MPa |
|                                | $P_2$  | 8,70  | MPa |
| $\Delta r$                     | $r_1$  | 1,415 | mm  |
|                                | $r_2$  | 1,631 | mm  |

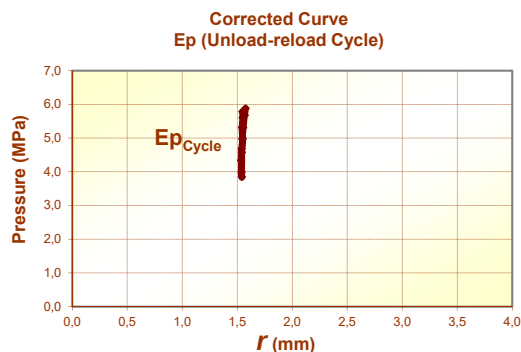
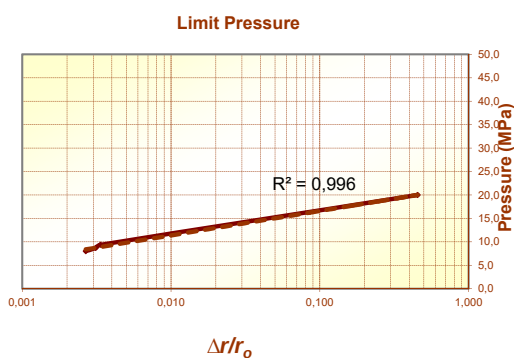
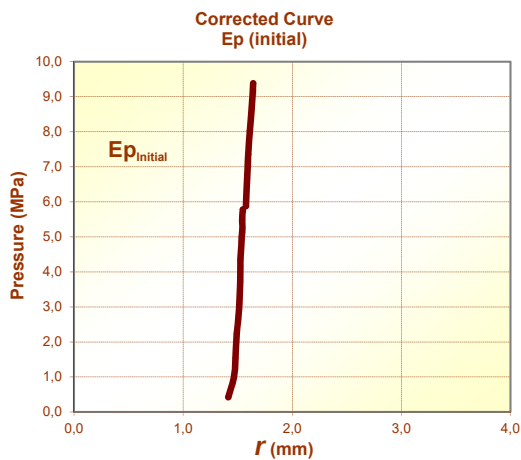
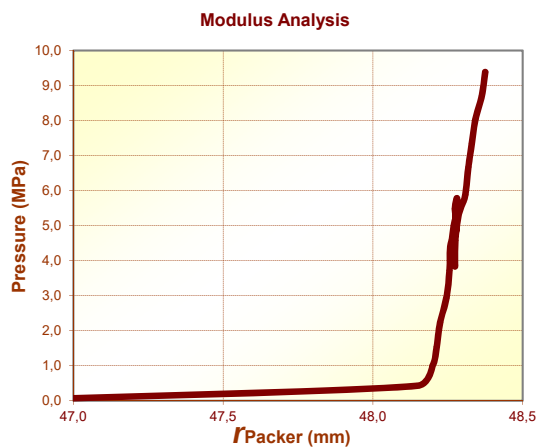
|               |   |      |     |
|---------------|---|------|-----|
| $E_p$ Initial | = | 2397 | MPa |
| $G_p$ Initial | = | 922  | MPa |

| Unload-Reload Modulus Analysis |       |       |     |
|--------------------------------|-------|-------|-----|
| $\Delta P$                     | $P_1$ | 3,85  | MPa |
|                                | $P_2$ | 6,67  | MPa |
| $\Delta r$                     | $r_1$ | 1,542 | mm  |
|                                | $r_2$ | 1,587 | mm  |

|             |   |      |     |
|-------------|---|------|-----|
| $E_p$ cycle | = | 3960 | MPa |
| $G_p$ cycle | = | 1523 | MPa |

|                |          |
|----------------|----------|
| Yield Pressure | >9 MPa   |
| Limit Pressure | >18 MPa  |
| P0 =           | 0,42 MPa |

| Line | PRESSURE<br>(CORRECTED)<br>(MPa) | $r$<br>(CORRECTED)<br>(mm) | $r$ Packer<br>(mm) |
|------|----------------------------------|----------------------------|--------------------|
| 1    | 0,00                             | 0,000                      | 46,732             |
| 2    | 0,42                             | 1,415                      | 48,147             |
| 3    | 1,01                             | 1,467                      | 48,199             |
| 4    | 1,54                             | 1,481                      | 48,213             |
| 5    | 2,23                             | 1,492                      | 48,224             |
| 6    | 2,93                             | 1,513                      | 48,245             |
| 7    | 3,72                             | 1,523                      | 48,255             |
| 8    | 4,36                             | 1,525                      | 48,257             |
| 9    | 4,63                             | 1,532                      | 48,264             |
| 10   | 5,00                             | 1,538                      | 48,270             |
| 11   | 5,25                             | 1,544                      | 48,276             |
| 12   | 5,49                             | 1,541                      | 48,273             |
| 13   | 5,78                             | 1,548                      | 48,280             |
| 14   | 5,60                             | 1,550                      | 48,282             |
| 15   | 5,31                             | 1,544                      | 48,276             |
| 16   | 5,00                             | 1,548                      | 48,280             |
| 17   | 4,68                             | 1,541                      | 48,273             |
| 18   | 4,34                             | 1,536                      | 48,268             |
| 19   | 3,99                             | 1,540                      | 48,272             |
| 20   | 3,85                             | 1,542                      | 48,274             |
| 21   | 4,58                             | 1,543                      | 48,275             |
| 22   | 4,96                             | 1,548                      | 48,280             |
| 23   | 5,31                             | 1,554                      | 48,286             |
| 24   | 5,67                             | 1,569                      | 48,301             |
| 25   | 5,88                             | 1,577                      | 48,309             |
| 26   | 6,67                             | 1,587                      | 48,319             |
| 27   | 7,35                             | 1,598                      | 48,330             |
| 28   | 8,02                             | 1,610                      | 48,342             |
| 29   | 8,70                             | 1,631                      | 48,363             |
| 30   | 9,38                             | 1,643                      | 48,375             |

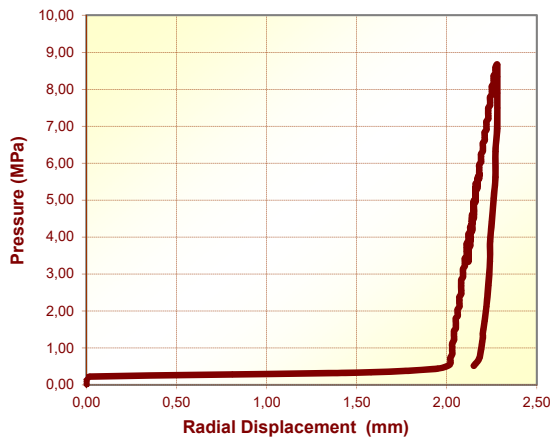


|             |                          |            |                                       |                    |
|-------------|--------------------------|------------|---------------------------------------|--------------------|
| Customer :  | TECNILAB SA              | Location : | Amador, Panamá.                       |                    |
| Borehole :  | 3                        | Depth :    | 25,62m                                | Water Level : 7,5m |
| Project :   | Proyecto CAVAROSA        |            | Test date : 28/02/2024                |                    |
| Lithology : | Roca sana                |            | Pressuremeter Probe: OYO ELASTMETER-2 |                    |
| Comments :  | Packer: 25,36m a 25,88m. |            |                                       |                    |

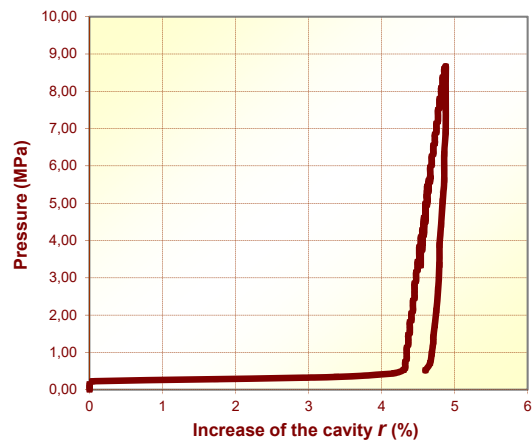
**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012**  
**RAW DATA**

| Line | PRESSURE<br>(RAW DATA) | PRESSURE<br>(CORRECTED) | RADIAL DISPLACEMENT (mm) |  |  |  | r (CORRECTED)<br>(mm) |
|------|------------------------|-------------------------|--------------------------|--|--|--|-----------------------|
|      | (MPa)                  | (MPa)                   |                          |  |  |  |                       |
| 1    | 0,00                   | 0,000                   | 0,00                     |  |  |  | 0,000                 |
| 2    | 0,53                   | 0,512                   | 1,98                     |  |  |  | 1,974                 |
| 3    | 0,66                   | 0,638                   | 2,01                     |  |  |  | 2,002                 |
| 4    | 1,03                   | 1,010                   | 2,03                     |  |  |  | 2,017                 |
| 5    | 1,38                   | 1,363                   | 2,04                     |  |  |  | 2,023                 |
| 6    | 1,72                   | 1,696                   | 2,05                     |  |  |  | 2,029                 |
| 7    | 2,38                   | 2,362                   | 2,07                     |  |  |  | 2,040                 |
| 8    | 3,14                   | 3,117                   | 2,09                     |  |  |  | 2,051                 |
| 9    | 3,81                   | 3,792                   | 2,11                     |  |  |  | 2,063                 |
| 10   | 4,44                   | 4,419                   | 2,14                     |  |  |  | 2,085                 |
| 11   | 5,14                   | 5,115                   | 2,16                     |  |  |  | 2,096                 |
| 12   | 5,71                   | 5,683                   | 2,18                     |  |  |  | 2,109                 |
| 13   | 5,44                   | 5,419                   | 2,16                     |  |  |  | 2,092                 |
| 14   | 5,10                   | 5,075                   | 2,16                     |  |  |  | 2,097                 |
| 15   | 4,79                   | 4,762                   | 2,15                     |  |  |  | 2,090                 |
| 16   | 4,42                   | 4,399                   | 2,14                     |  |  |  | 2,085                 |
| 17   | 4,10                   | 4,076                   | 2,13                     |  |  |  | 2,079                 |
| 18   | 3,80                   | 3,782                   | 2,12                     |  |  |  | 2,073                 |
| 19   | 3,51                   | 3,488                   | 2,12                     |  |  |  | 2,076                 |
| 20   | 3,33                   | 3,312                   | 2,11                     |  |  |  | 2,069                 |
| 21   | 3,66                   | 3,635                   | 2,12                     |  |  |  | 2,075                 |
| 22   | 3,95                   | 3,929                   | 2,13                     |  |  |  | 2,081                 |
| 23   | 4,42                   | 4,399                   | 2,14                     |  |  |  | 2,085                 |
| 24   | 5,15                   | 5,124                   | 2,16                     |  |  |  | 2,096                 |
| 25   | 5,74                   | 5,712                   | 2,18                     |  |  |  | 2,109                 |
| 26   | 6,33                   | 6,300                   | 2,20                     |  |  |  | 2,121                 |
| 27   | 6,90                   | 6,878                   | 2,22                     |  |  |  | 2,134                 |
| 28   | 7,49                   | 7,465                   | 2,24                     |  |  |  | 2,147                 |
| 29   | 8,08                   | 8,053                   | 2,26                     |  |  |  | 2,159                 |
| 30   | 8,66                   | 8,630                   | 2,29                     |  |  |  | 2,182                 |

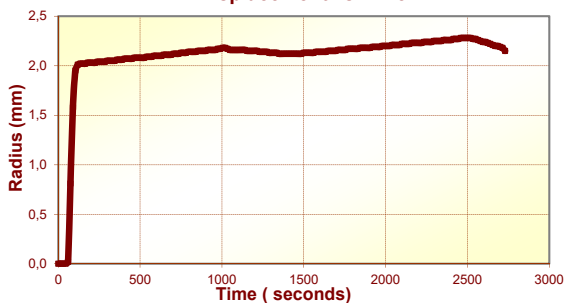
**Pressuremeter Curve**



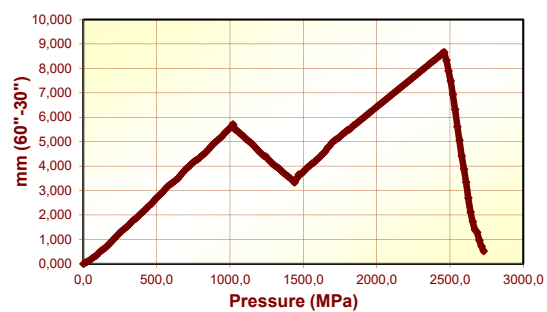
**Pressuremeter Curve**



**Displacement vs Time**



**Pressure vs Time**



|             |                          |                      |                  |               |            |
|-------------|--------------------------|----------------------|------------------|---------------|------------|
| Customer :  | TECNILAB SA              | Location :           | Amador, Panamá.  |               |            |
| Borehole :  | 3                        | Depth :              | 25,62m           | Water Level : | 7,5m       |
| Project :   | Proyecto CAVAROSA        |                      |                  | Test date :   | 28/02/2024 |
| Lithology : | Roca sana                | Pressuremeter Probe: | OYO ELASTMETER-2 |               |            |
| Comments :  | Packer: 25,36m a 25,88m. | N° Packer            | P22              |               |            |

**EUROCODE-7 - ASTM-D4719-BS EN ISO 22476-5:2012  
INTERPRETATION**

| Initial Modulus Analysis  |        |       |     |
|---------------------------|--------|-------|-----|
| Poisson's Ratio $\nu$     | 0,30   |       |     |
| Radius of the packer (R0) | 46,732 | mm    |     |
| $\Delta P$                | $P_1$  | 0,51  | MPa |
|                           | $P_2$  | 8,05  | MPa |
| $\Delta r$                | $r_1$  | 1,974 | mm  |
|                           | $r_2$  | 2,159 | mm  |

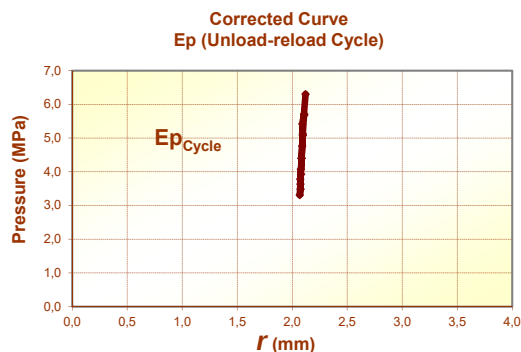
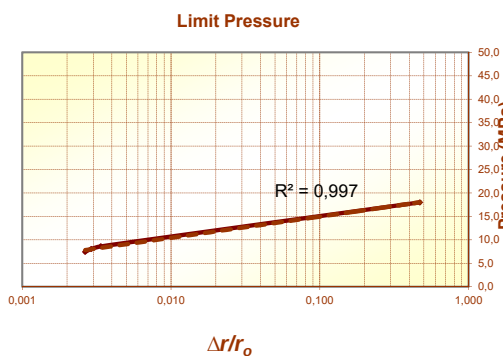
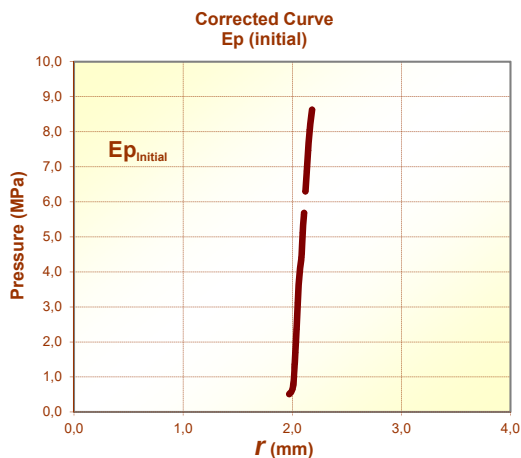
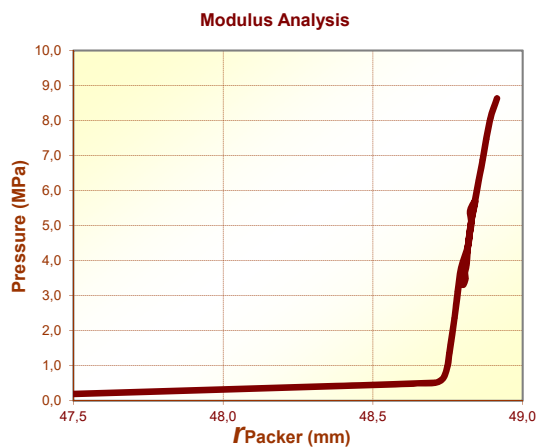
|                         |   |      |     |
|-------------------------|---|------|-----|
| $E_{p \text{ initial}}$ | = | 2576 | MPa |
| $G_{p \text{ initial}}$ | = | 991  | MPa |

| Unload-Reload Modulus Analysis |       |       |     |
|--------------------------------|-------|-------|-----|
| $\Delta P$                     | $P_1$ | 3,31  | MPa |
|                                | $P_2$ | 5,71  | MPa |
| $\Delta r$                     | $r_1$ | 2,069 | mm  |
|                                | $r_2$ | 2,109 | mm  |

|                       |   |      |     |
|-----------------------|---|------|-----|
| $E_{p \text{ cycle}}$ | = | 3808 | MPa |
| $G_{p \text{ cycle}}$ | = | 1465 | MPa |

|                |          |
|----------------|----------|
| Yield Pressure | 8,20 MPa |
| Limit Pressure | >17 MPa  |
| P0 =           | 0,51 MPa |

| Line | PRESSURE<br>(CORRECTED)<br>(MPa) | $r$<br>(CORRECTED)<br>(mm) | $r_{\text{Packer}}$<br>(mm) |
|------|----------------------------------|----------------------------|-----------------------------|
| 1    | 0,00                             | 0,000                      | 46,732                      |
| 2    | 0,51                             | 1,974                      | 48,706                      |
| 3    | 0,64                             | 2,002                      | 48,734                      |
| 4    | 1,01                             | 2,017                      | 48,749                      |
| 5    | 1,36                             | 2,023                      | 48,755                      |
| 6    | 1,70                             | 2,029                      | 48,761                      |
| 7    | 2,36                             | 2,040                      | 48,772                      |
| 8    | 3,12                             | 2,051                      | 48,783                      |
| 9    | 3,79                             | 2,063                      | 48,795                      |
| 10   | 4,42                             | 2,085                      | 48,817                      |
| 11   | 5,11                             | 2,096                      | 48,828                      |
| 12   | 5,68                             | 2,109                      | 48,841                      |
| 13   | 5,42                             | 2,092                      | 48,824                      |
| 14   | 5,08                             | 2,097                      | 48,829                      |
| 15   | 4,76                             | 2,090                      | 48,822                      |
| 16   | 4,40                             | 2,085                      | 48,817                      |
| 17   | 4,08                             | 2,079                      | 48,811                      |
| 18   | 3,78                             | 2,073                      | 48,805                      |
| 19   | 3,49                             | 2,076                      | 48,808                      |
| 20   | 3,31                             | 2,069                      | 48,801                      |
| 21   | 3,64                             | 2,075                      | 48,807                      |
| 22   | 3,93                             | 2,081                      | 48,813                      |
| 23   | 4,40                             | 2,085                      | 48,817                      |
| 24   | 5,12                             | 2,096                      | 48,828                      |
| 25   | 5,71                             | 2,109                      | 48,841                      |
| 26   | 6,30                             | 2,121                      | 48,853                      |
| 27   | 6,88                             | 2,134                      | 48,866                      |
| 28   | 7,47                             | 2,147                      | 48,879                      |
| 29   | 8,05                             | 2,159                      | 48,891                      |
| 30   | 8,63                             | 2,182                      | 48,914                      |





**APENDICE M**  
**PRUEBAS DE LABORATORIO**

**TECNILAB, S. A.**

SFERA PROPERTIES CORP

CAVAROSA

TRABAJO No. 2-1259

RESUMEN GENERAL DE PRUEBAS DE LABORATORIO DE SUELOS

| SONDEO No. | TIPO DE MUESTRA | PROFUNDIDAD<br>(m) | CLASIFICACIÓNn S.U.C.S. | CLASIFICACIÓN AASHTO | ÍNDICE DE GRUPO | ANÁLISIS GRANULOMÉTRICO |            |            | LL | LP | IP | CONSOLIDACIÓN |       |       | HINCHAMIENTO<br>Y<br>COLAPSO |
|------------|-----------------|--------------------|-------------------------|----------------------|-----------------|-------------------------|------------|------------|----|----|----|---------------|-------|-------|------------------------------|
|            |                 |                    |                         |                      |                 | % QUE PASA TAMIZ No.    |            |            |    |    |    | σp'           | Cc    | Cs    | %                            |
|            |                 |                    |                         |                      |                 | %<br>GRAVA              | %<br>ARENA | %<br>FINOS |    |    |    |               |       |       |                              |
| 3          | I               | 21.00 - 21.90      | ML                      | A-7-5                | 7               | 1.90                    | 39.80      | 58.30      | 47 | 33 | 14 | 3.530         | 0.339 | 0.059 | 0.881                        |
| 4          | A               | 21.00 - 21.45      | MH                      | A-7-5                | 32              | 0.00                    | 15.80      | 84.24      | 66 | 33 | 33 | -             | -     | -     | -                            |
| 5          | I               | 18.00 - 18.90      | SM                      | A-2-4                | 0               | 0.00                    | 85.80      | 14.20      | 35 | 25 | 10 | 3.045         | 0.319 | 0.025 | -                            |



**TECNILAB, S. A.**  
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LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18361-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 1  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 1-12  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 0.60-16.95  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 10-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 21-feb-24 FECHA DE ENSAYO /TEST DATE: 21-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 22-feb-24

| Nro. | Muestra No./Sample No.                             | 1          | 2          | 3          | 4          | 10          | 11          | 12          |
|------|----------------------------------------------------|------------|------------|------------|------------|-------------|-------------|-------------|
| 1    | Material/Material                                  | SUELO      | SUELO      | SUELO      | SUELO      | SUELO       | SUELO       | SUELO       |
| 2    | Hoyo No./Borehole No.                              | 1          | 1          | 1          | 1          | 1           | 1           | 1           |
| 3    | Profundidad/Depth                                  | 0.60-1.05  | 1.50-1.95  | 3.00-3.45  | 4.50-4.75  | 13.50-13.95 | 15.00-15.45 | 16.50-16.95 |
| 4    | Método Usado / Test Method Used                    | B          | B          | B          | B          | B           | B           | B           |
| 5    | Tara No./Can No.                                   | 155        | BO         | 22         | 100        | 39          | 25          | 11          |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 211.60     | 249.70     | 209.20     | 200.00     | 232.90      | 232.00      | 219.40      |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 200.00     | 230.30     | 198.60     | 195.90     | 210.60      | 210.10      | 205.60      |
| 8    | Peso de Agua/Mass of Water (g)                     | 11.60      | 19.40      | 10.60      | 4.10       | 22.30       | 21.90       | 13.80       |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 136.70     | 137.50     | 137.60     | 137.60     | 136.70      | 137.60      | 136.20      |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 63.30      | 92.80      | 61.00      | 58.30      | 73.90       | 72.50       | 69.40       |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 18.3       | 20.9       | 17.4       | 7          | 30.2        | 30.2        | 19.9        |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by J. Cedeño Compilado por /Compiled by: A. Hernández  
Ensayado por / Tested by : O. Estrada Presentado por / Presented by: Tecnilab, S.A.

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Versión: 8

Fecha de Revisión: 24-ene-2023



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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1973

**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18152-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 1  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 13  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 18.00-18.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 10-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 21-feb-24 FECHA DE ENSAYO /TEST DATE: 21-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 22-feb-24

|      |                                                    |             |    |    |    |    |    |    |
|------|----------------------------------------------------|-------------|----|----|----|----|----|----|
| Nro. | Muestra No./Sample No.                             | 13          |    |    |    |    |    |    |
| 1    | Material/Material                                  | SUELO       |    |    |    |    |    |    |
| 2    | Hoyo No./Borehole No.                              | 1           |    |    |    |    |    |    |
| 3    | Profundidad/Depth                                  | 18.00-18.45 |    |    |    |    |    |    |
| 4    | Método Usado / Test Method Used                    | B           |    |    |    |    |    |    |
| 5    | Tara No./Can No.                                   | 20          |    |    |    |    |    |    |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 219.00      |    |    |    |    |    |    |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 209.00      |    |    |    |    |    |    |
| 8    | Peso de Agua/Mass of Water (g)                     | 10.00       | -- | -- | -- | -- | -- | -- |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 137.60      |    |    |    |    |    |    |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 71.40       | -- | -- | -- | -- | -- | -- |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 14          | -- | -- | -- | -- | -- | -- |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | -- | -- | -- | -- | -- | -- |

OBSERVACIONES/REMARKS:

**Equipo utilizado para el Ensayo/ Equipment used for the Test**

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: 1573

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: \_\_\_\_\_

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: 0896

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: \_\_\_\_\_

Muestreado en Campo por/Sampled on site by

J. Cedeño

Compilado por /Compiled by:

A. Hernández

Ensayado por / Tested by :

O. Estrada

Presentado por / Presented by:

Tecnilab, S.A.

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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18375-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 2  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 1-7  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 0.60-9.25  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 19-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 26-feb-24 FECHA DE ENSAYO /TEST DATE: 26-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 27-feb-24

| Nro. | Muestra No./Sample No.                             | 1          | 2          | 3          | 4          | 5          | 6          | 7          |
|------|----------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 1    | Material/Material                                  | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      |
| 2    | Hoyo No./Borehole No.                              | 2          | 2          | 2          | 2          | 2          | 2          | 2          |
| 3    | Profundidad/Depth                                  | 0.60-1.05  | 1.50-1.95  | 3.00-3.45  | 4.50-4.55  | 6.00-6.25  | 7.50-7.70  | 9.00-9.25  |
| 4    | Método Usado / Test Method Used                    | B          | B          | B          | B          | B          | B          | B          |
| 5    | Tara No./Can No.                                   | 71         | A8         | 9          | 10         | 21         | 22         | 23         |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 196.60     | 226.50     | 227.80     | 213.70     | 291.90     | 236.80     | 217.20     |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 190.50     | 207.60     | 206.60     | 208.10     | 281.60     | 215.60     | 206.10     |
| 8    | Peso de Agua/Mass of Water (g)                     | 6.10       | 18.90      | 21.20      | 5.60       | 10.30      | 21.20      | 11.10      |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 139.60     | 139.40     | 137.60     | 137.60     | 137.60     | 138.60     | 137.60     |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 50.90      | 68.20      | 69.00      | 70.50      | 144.00     | 77.00      | 68.50      |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 12         | 27.7       | 30.7       | 7.9        | 7.2        | 27.5       | 16.2       |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: J. Cedeño  
Ensayado por / Tested by : O. Estrada  
Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18375-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 2  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 8-12  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 10.50-16.95  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 19-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 26-feb-24 FECHA DE ENSAYO /TEST DATE: 26-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 27-feb-24

| Nro. | Muestra No./Sample No.                             | 8           | 9           | 10          | 11          | 12          |    |    |
|------|----------------------------------------------------|-------------|-------------|-------------|-------------|-------------|----|----|
| 1    | Material/Material                                  | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       |    |    |
| 2    | Hoyo No./Borehole No.                              | 2           | 2           | 2           | 2           | 2           |    |    |
| 3    | Profundidad/Depth                                  | 10.50-10.95 | 12.00-12.45 | 13.50-13.95 | 15.00-15.45 | 16.50-16.95 |    |    |
| 4    | Método Usado / Test Method Used                    | B           | B           | B           | B           | B           |    |    |
| 5    | Tara No./Can No.                                   | 24          | 92          | B1          | 692         | 830         |    |    |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 217.30      | 234.70      | 225.10      | 237.10      | 230.50      |    |    |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 199.60      | 215.60      | 205.60      | 212.60      | 205.60      |    |    |
| 8    | Peso de Agua/Mass of Water (g)                     | 17.70       | 19.10       | 19.50       | 24.50       | 24.90       | -- | -- |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 139.80      | 138.60      | 139.60      | 136.60      | 136.60      |    |    |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 59.80       | 77.00       | 66.00       | 76.00       | 69.00       | -- | -- |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 29.6        | 24.8        | 29.5        | 32.2        | 36.1        | -- | -- |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | -- | -- |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: J. Cedeño Compilado por /Compiled by: A. Hernández  
Ensayado por / Tested by : O. Estrada Presentado por / Presented by: Tecnilab, S.A.

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Fecha de Revisión: 24-ene-2023



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18382-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 3  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 1-7  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 0.60-9.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 26-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 28-feb-24 FECHA DE ENSAYO /TEST DATE: 28-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 29-feb-24

| Nro. | Muestra No./Sample No.                             | 1          | 2          | 3          | 4          | 5          | 6          | 7          |
|------|----------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 1    | Material/Material                                  | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      |
| 2    | Hoyo No./Borehole No.                              | 3          | 3          | 3          | 3          | 3          | 3          | 3          |
| 3    | Profundidad/Depth                                  | 0.60-1.05  | 1.50-1.95  | 3.00-3.45  | 4.50-4.55  | 6.00-6.45  | 7.50-7.95  | 9.00-9.45  |
| 4    | Método Usado / Test Method Used                    | B          | B          | B          | B          | B          | B          | B          |
| 5    | Tara No./Can No.                                   | 400        | 610        | 24         | P1         | 13B        | 742        | 202        |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 234.40     | 211.90     | 221.60     | 191.80     | 209.00     | 212.50     | 239.00     |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 213.60     | 200.10     | 209.10     | 181.60     | 198.10     | 200.10     | 221.70     |
| 8    | Peso de Agua/Mass of Water (g)                     | 20.80      | 11.80      | 12.50      | 10.20      | 10.90      | 12.40      | 17.30      |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 138.60     | 138.60     | 137.60     | 137.60     | 137.60     | 138.60     | 137.60     |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 75.00      | 61.50      | 71.50      | 44.00      | 60.50      | 61.50      | 84.10      |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 27.7       | 19.2       | 17.5       | 23.2       | 18         | 20.2       | 20.6       |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: A. Nieto  
Ensayado por / Tested by : O. Estrada

Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

El presente informe no deberá reproducirse, sin la aprobación escrita de TECNILAB, S.A.

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Versión: 8

Fecha de Revisión: 24-ene-2023



**TECNILAB, S. A.**  
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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18382-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 3  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 8-16  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 10.50-19.95  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 26-feb-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 28-feb-24 FECHA DE ENSAYO /TEST DATE: 28-feb-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 29-feb-24

| Nro. | Muestra No./Sample No.                             | 8           | 10          | 12          | 13          | 14          | 15          | 16          |
|------|----------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1    | Material/Material                                  | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       |
| 2    | Hoyo No./Borehole No.                              | 3           | 3           | 3           | 3           | 3           | 3           | 3           |
| 3    | Profundidad/Depth                                  | 10.50-10.60 | 12.00-12.20 | 13.50-13.95 | 15.00-15.45 | 16.50-16.95 | 18.00-18.45 | 19.50-19.95 |
| 4    | Método Usado / Test Method Used                    | B           | B           | B           | B           | B           | B           | B           |
| 5    | Tara No./Can No.                                   | C8          | 820         | 91          | 012         | 10B         | 50          | 21          |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 242.80      | 254.40      | 179.10      | 228.90      | 222.40      | 249.50      | 220.80      |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 229.60      | 236.10      | 160.00      | 200.10      | 199.90      | 225.10      | 192.60      |
| 8    | Peso de Agua/Mass of Water (g)                     | 13.20       | 18.30       | 19.10       | 28.80       | 22.50       | 24.40       | 28.20       |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 137.60      | 138.60      | 136.70      | 136.70      | 138.60      | 136.60      | 137.60      |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 92.00       | 97.50       | 23.30       | 63.40       | 61.30       | 88.50       | 55.00       |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 14.3        | 18.8        | 82          | 45.4        | 36.7        | 27.6        | 51.3        |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: A. Nieto  
Ensayado por / Tested by : O. Estrada

Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

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Versión: 8

Fecha de Revisión: 24-ene-2023



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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18308-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 4  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 1-7  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 0.60-9.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 05-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 06-mar-24

| Nro. | Muestra No./Sample No.                             | 1          | 2          | 3          | 4          | 5          | 6          | 7          |
|------|----------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 1    | Material/Material                                  | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      |
| 2    | Hoyo No./Borehole No.                              | 4          | 4          | 4          | 4          | 4          | 4          | 4          |
| 3    | Profundidad/Depth                                  | 0.60-1.05  | 1.50-1.95  | 3.00-3.45  | 4.50-4.95  | 6.00-6.45  | 7.50-7.95  | 9.00-9.45  |
| 4    | Método Usado / Test Method Used                    | B          | B          | B          | B          | B          | B          | B          |
| 5    | Tara No./Can No.                                   | KL         | KPO        | 35         | 21         | 13         | AL         | 201        |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 262.80     | 236.10     | 227.10     | 241.50     | 187.40     | 200.50     | 202.20     |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 242.10     | 221.60     | 212.10     | 232.00     | 179.60     | 190.50     | 190.60     |
| 8    | Peso de Agua/Mass of Water (g)                     | 20.70      | 14.50      | 15.00      | 9.50       | 7.80       | 10.00      | 11.60      |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 138.60     | 137.60     | 136.60     | 138.60     | 137.60     | 137.60     | 137.60     |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 103.50     | 84.00      | 75.50      | 93.40      | 42.00      | 52.90      | 53.00      |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 20         | 17.3       | 19.9       | 10.2       | 18.6       | 18.9       | 21.9       |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by J. Cedeño  
Ensayado por / Tested by : O. Estrada

Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18308-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 4  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 8-15  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 10.50-21.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 05-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 06-mar-24

| Nro. | Muestra No./Sample No.                             | 8           | 9           | 10          | 12          | 13          | 14          | 15          |
|------|----------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1    | Material/Material                                  | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       |
| 2    | Hoyo No./Borehole No.                              | 4           | 4           | 4           | 4           | 4           | 4           | 4           |
| 3    | Profundidad/Depth                                  | 10.50-10.95 | 12.00-12.20 | 13.50-13.95 | 16.50-16.95 | 18.00-18.45 | 19.50-19.95 | 21.00-21.45 |
| 4    | Método Usado / Test Method Used                    | B           | B           | B           | B           | B           | B           | B           |
| 5    | Tara No./Can No.                                   | 120         | 88          | 101         | 2           | 24          | 34          | 25          |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 223.50      | 222.20      | 290.20      | 190.20      | 260.70      | 187.40      | 215.20      |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 210.60      | 210.70      | 265.60      | 176.10      | 239.60      | 171.60      | 200.50      |
| 8    | Peso de Agua/Mass of Water (g)                     | 12.90       | 11.50       | 24.60       | 14.10       | 21.10       | 15.80       | 14.70       |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 137.60      | 137.60      | 137.60      | 138.10      | 138.60      | 137.60      | 137.60      |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 73.00       | 73.10       | 128.00      | 38.00       | 101.00      | 34.00       | 62.90       |
| 11   | Contenido de Humedad/<br>Moisture content (%)      | 17.7        | 15.7        | 19.2        | 37.1        | 20.9        | 46.5        | 23.4        |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: J. Cedeño  
Ensayado por / Tested by : O. Estrada  
Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

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Fecha de Revisión: 24-ene-2023



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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18308-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 4  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 16  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 22.50-22.95  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 05-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 06-mar-24

|      |                                                    |             |    |    |    |    |    |    |
|------|----------------------------------------------------|-------------|----|----|----|----|----|----|
| Nro. | Muestra No./Sample No.                             | 16          |    |    |    |    |    |    |
| 1    | Material/Material                                  | SUELO       |    |    |    |    |    |    |
| 2    | Hoyo No./Borehole No.                              | 4           |    |    |    |    |    |    |
| 3    | Profundidad/Depth                                  | 22.50-22.95 |    |    |    |    |    |    |
| 4    | Método Usado / Test Method Used                    | B           |    |    |    |    |    |    |
| 5    | Tara No./Can No.                                   | 92          |    |    |    |    |    |    |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 252.30      |    |    |    |    |    |    |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 237.60      |    |    |    |    |    |    |
| 8    | Peso de Agua/Mass of Water (g)                     | 14.70       | -- | -- | -- | -- | -- | -- |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 136.80      |    |    |    |    |    |    |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 100.80      | -- | -- | -- | -- | -- | -- |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 14.6        | -- | -- | -- | -- | -- | -- |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | -- | -- | -- | -- | -- | -- |

OBSERVACIONES/REMARKS:

**Equipo utilizado para el Ensayo/ Equipment used for the Test**

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: 1573

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: \_\_\_\_\_

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: 0896

Equipo/Equipment: \_\_\_\_\_

No. Serie/Serial #: \_\_\_\_\_

Muestreado en Campo por/Sampled on site by

J. Cedeño

Compilado por /Compiled by:

A. Hernández

Ensayado por / Tested by :

O. Estrada

Presentado por / Presented by:

Tecnilab, S.A.

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**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18399-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 5  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 1-7  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 0.60-9.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 04-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 05-mar-24

| Nro. | Muestra No./Sample No.                             | 1          | 2          | 3          | 4          | 5          | 6          | 7          |
|------|----------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| 1    | Material/Material                                  | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      | SUELO      |
| 2    | Hoyo No./Borehole No.                              | 5          | 5          | 5          | 5          | 5          | 5          | 5          |
| 3    | Profundidad/Depth                                  | 0.60-1.05  | 1.50-1.95  | 3.00-3.45  | 4.50-4.95  | 6.00-6.45  | 7.50-7.95  | 9.00-9.45  |
| 4    | Método Usado / Test Method Used                    | B          | B          | B          | B          | B          | B          | B          |
| 5    | Tara No./Can No.                                   | 10         | 92         | 33         | 64         | D5         | 46         | P5         |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 203.30     | 238.50     | 222.20     | 214.60     | 243.60     | 241.10     | 226.80     |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 195.60     | 226.10     | 214.60     | 206.00     | 227.60     | 226.60     | 213.10     |
| 8    | Peso de Agua/Mass of Water (g)                     | 7.70       | 12.40      | 7.60       | 8.60       | 16.00      | 14.50      | 13.70      |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 137.60     | 137.60     | 138.60     | 136.10     | 138.60     | 138.10     | 139.60     |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 58.00      | 88.50      | 76.00      | 69.90      | 89.00      | 88.50      | 73.50      |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 13.3       | 14         | 10         | 12.3       | 18         | 16.4       | 18.6       |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C | 110 ± 5 °C |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: A. Nieto  
Ensayado por / Tested by : O. Estrada

Compilado por /Compiled by: A. Hernández  
Presentado por / Presented by: Tecnilab, S.A.

El presente informe no deberá reproducirse, sin la aprobación escrita de TECNILAB, S.A.

Los resultados de este informe sólo están relacionados con las muestras indicadas en el mismo.

Versión: 8

Fecha de Revisión: 24-ene-2023



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18399-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 5  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 8-14  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 10.50-21.45  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 04-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 05-mar-24

| Nro. | Muestra No./Sample No.                             | 8           | 9           | 10          | 11          | 12          | 13          | 14          |
|------|----------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1    | Material/Material                                  | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       | SUELO       |
| 2    | Hoyo No./Borehole No.                              | 5           | 5           | 5           | 5           | 5           | 5           | 5           |
| 3    | Profundidad/Depth                                  | 10.50-10.95 | 12.00-12.45 | 13.50-13.95 | 15.00-15.10 | 16.50-16.95 | 19.50-19.95 | 21.00-21.45 |
| 4    | Método Usado / Test Method Used                    | B           | B           | B           | B           | B           | B           | B           |
| 5    | Tara No./Can No.                                   | 960         | 35          | 13          | A           | 23          | 63          | 1           |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 239.10      | 234.30      | 228.90      | 226.30      | 233.60      | 287.00      | 228.40      |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 210.00      | 216.10      | 209.10      | 213.10      | 219.10      | 259.60      | 205.00      |
| 8    | Peso de Agua/Mass of Water (g)                     | 29.10       | 18.20       | 19.80       | 13.20       | 14.50       | 27.40       | 23.40       |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 137.60      | 137.60      | 136.60      | 137.60      | 136.70      | 138.60      | 136.60      |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 72.40       | 78.50       | 72.50       | 75.50       | 82.40       | 121.00      | 68.40       |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 40.2        | 23.2        | 27.3        | 17.5        | 17.6        | 22.6        | 34.2        |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  | 110 ± 5 °C  |

OBSERVACIONES/REMARKS:

| Equipo utilizado para el Ensayo/ Equipment used for the Test |                     |      |                   |
|--------------------------------------------------------------|---------------------|------|-------------------|
| Equipo/Equipment:                                            | No. Serie/Serial #: | 1573 | Equipo/Equipment: |
| Equipo/Equipment:                                            | No. Serie/Serial #: | 0896 | Equipo/Equipment: |

Muestreado en Campo por/Sampled on site by: A. Nieto Compilado por /Compiled by: A. Hernández  
Ensayado por / Tested by : O. Estrada Presentado por / Presented by: Tecnilab, S.A.

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Versión: 8

Fecha de Revisión: 24-ene-2023



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**CONTENIDO DE HUMEDAD NATURAL/  
NATURAL MOISTURE CONTENT  
ASTM D 2216**

**F-081**

**Área/Area:**

Pruebas y Ensayos/ Test and Trials

**Nro. Informe**

18399-1A-2024

TRABAJO No./JOB No.: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP HOYO No./ HOLE #: 5  
PROYECTO/PROJECT: CAVAROSA MUESTRA/SAMPLE: 15  
LOCALIZACION/LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ PROFUNDIDAD/DEPTH: 22.50-22.95  
COORDENADAS/ COORDINATES: ELEVACIÓN/ELEVATION: -  
MUESTREO POR/SAMPLED BY: TECNILAB, S.A. FECHA DE MUESTREO/ SAMPLE DATE: 01-mar-24 MATERIAL/MATERIAL: SUELO  
FECHA DE RECEPCION/DATE RECEPCION: 04-mar-24 FECHA DE ENSAYO /TEST DATE: 05-mar-24 FUENTE / SOURCE : SPT  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING : ASTM D 1586 FECHA DE REPORTE /REPORT DATE: 05-mar-24

|      |                                                    |             |    |    |    |    |    |    |
|------|----------------------------------------------------|-------------|----|----|----|----|----|----|
| Nro. | Muestra No./Sample No.                             | 15          |    |    |    |    |    |    |
| 1    | Material/Material                                  | SUELO       |    |    |    |    |    |    |
| 2    | Hoyo No./Borehole No.                              | 5           |    |    |    |    |    |    |
| 3    | Profundidad/Depth                                  | 22.50-22.95 |    |    |    |    |    |    |
| 4    | Método Usado / Test Method Used                    | B           |    |    |    |    |    |    |
| 5    | Tara No./Can No.                                   | 961         |    |    |    |    |    |    |
| 6    | Tara + Suelo Húmedo/<br>Mass of wet Soil + Can (g) | 213.70      |    |    |    |    |    |    |
| 7    | Tara + Suelo Seco/<br>Mass of dry Soil + Can (g)   | 200.00      |    |    |    |    |    |    |
| 8    | Peso de Agua/Mass of Water (g)                     | 13.70       | -- | -- | -- | -- | -- | -- |
| 9    | Peso de la Tara/<br>Mass of Can (g)                | 138.10      |    |    |    |    |    |    |
| 10   | Peso del suelo seco/<br>Mass of dry soil (g)       | 61.90       | -- | -- | -- | -- | -- | -- |
| 11   | Contenido de Húmedad/<br>Moisture content (%)      | 22.1        | -- | -- | -- | -- | -- | -- |
| 12   | Temperatura de Secado /<br>Dryn Temperature        | 110 ± 5 °C  | -- | -- | -- | -- | -- | -- |

OBSERVACIONES/REMARKS:

**Equipo utilizado para el Ensayo/ Equipment used for the Test**

Equipo/Equipment: No. Serie/Serial #: 1573 Equipo/Equipment: No. Serie/Serial #:   
Equipo/Equipment: No. Serie/Serial #: 0896 Equipo/Equipment: No. Serie/Serial #:

Muestreado en Campo por/Sampled on site by A. Nieto Compilado por /Compiled by: A. Hernández  
Ensayado por / Tested by : O. Estrada Presentado por / Presented by: Tecnilab, S.A.

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Versión: 8

Fecha de Revisión: 24-ene-2023

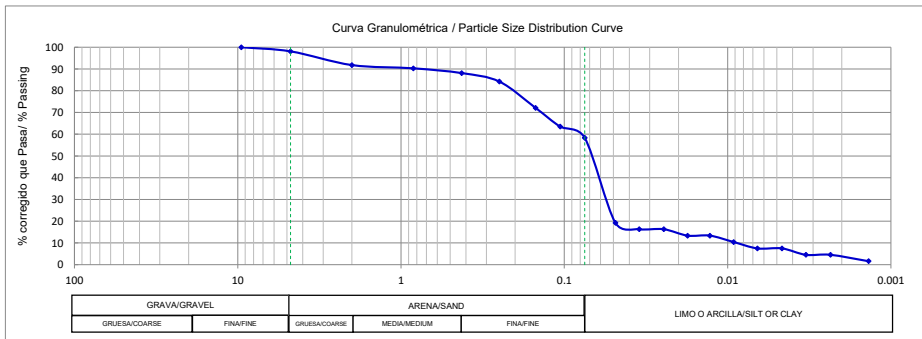
**F-060**

**Área/Área:**  
Pruebas y Ensayos/ Test and Trials

**Nro. Informe / Report No.**  
**18384-1AG-2024**

TRABAJO Nro./ JOB #: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP  
PROYECTO/PROJECT: CAVAROSA  
LOCALIZACIÓN / LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
MUESTREADO POR / SAMPLED BY: TECNILAB, S.A. FECHA/DATE: 27-feb-24  
FECHA DE RECEPCIÓN / RECEPCIÓN DATE: 28-feb-24 FECHA DE ENSAYO / TEST DATE: 1-mar-24  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING: ASTM D 4220 FECHA DE REPORTE/REPORT DATE: 2-mar-24

HOYO No./ HOLE #: 3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/DEPTH: 21.00-21.90  
ELEVACIÓN/ELEVATION: -  
MATERIAL/MATERIAL: SUELO  
FUENTE / SOURCE: SHELBY



| RESUMEN/ SUMMARY                             |    |                |     |
|----------------------------------------------|----|----------------|-----|
| L. L.                                        | 50 | C <sub>u</sub> | --- |
| P. L.                                        | 33 | C <sub>c</sub> | --- |
| P. I.                                        | 16 |                |     |
| CLASIFICACIÓN S.U.C.S./U.C.S. CLASSIFICATION |    |                |     |
| ML                                           |    |                |     |
| Limo Arenoso / Sandy Silt                    |    |                |     |
| CLASIFICACIÓN AASHTO/ AASHTO CLASSIFICATION  |    |                |     |
| CLASIFICACIÓN / CLASSIFICATION A-7-5         |    |                |     |
| ÍNDICE DE GRUPO/GROUP INDEX 9                |    |                |     |
| OBSERVACIONES/ REMARKS:                      |    |                |     |

| Procedimiento Para Obtener Especimen:<br>Procedure Uses To Obtain The Specimens: |                                          |                        |                      | Secado al Horno /<br>Oven dried                      |                                          | MÉTODO USADO / TEST METHOD USED |                      |                                |                                      |                                          | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |  |  |  |
|----------------------------------------------------------------------------------|------------------------------------------|------------------------|----------------------|------------------------------------------------------|------------------------------------------|---------------------------------|----------------------|--------------------------------|--------------------------------------|------------------------------------------|------------------------------------------------------------------|--|--|--|
| AGREGADO GRUESO/COARSE AGGREGATE                                                 |                                          |                        |                      | AGREGADO FINO/FINE AGGREGATE                         |                                          |                                 |                      |                                | *HIDRÓMETRO/HYDROMETER ASTM D 7928   |                                          |                                                                  |  |  |  |
| TAMIZ / SIEVE                                                                    | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED | % PASAJE / % PASSING | TAMIZ/ SIEVE                                         | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED          | % PASAJE / % PASSING | % CORR. PASAJE / CORR. PASSING | DIÁMETRO DE PARTÍCULA/ PARTICLE SIZE | CORREGIDO QUE PASAJE / CORRECTED PASSING |                                                                  |  |  |  |
| 4"                                                                               |                                          | ---                    | ---                  | #4                                                   | 5.20                                     | 1.93                            | 98.1                 | 98.1                           | 0.04867                              | 19.24202                                 |                                                                  |  |  |  |
| 3"                                                                               |                                          | ---                    | ---                  | #10                                                  | 22.10                                    | 8.20                            | 91.8                 | 91.8                           | 0.03482                              | 16.30                                    |                                                                  |  |  |  |
| 2 1/2"                                                                           |                                          | ---                    | ---                  | #20                                                  | 26.20                                    | 9.70                            | 90.3                 | 90.3                           | 0.02462                              | 16.30                                    |                                                                  |  |  |  |
| 2"                                                                               |                                          | ---                    | ---                  | #40                                                  | 32.20                                    | 11.90                           | 88.1                 | 88.1                           | 0.01761                              | 13.36                                    |                                                                  |  |  |  |
| 1 1/2"                                                                           |                                          | ---                    | ---                  | #60                                                  | 42.60                                    | 15.80                           | 84.2                 | 84.2                           | 0.01286                              | 13.36                                    |                                                                  |  |  |  |
| 1"                                                                               |                                          | ---                    | ---                  | #100                                                 | 75.30                                    | 27.90                           | 72.1                 | 72.1                           | 0.00919                              | 10.42                                    |                                                                  |  |  |  |
| 3/4"                                                                             |                                          | ---                    | ---                  | #140                                                 | 98.50                                    | 36.50                           | 63.5                 | 63.5                           | 0.00657                              | 7.48                                     |                                                                  |  |  |  |
| 1/2"                                                                             |                                          | ---                    | ---                  | #200                                                 | 112.60                                   | 41.70                           | 58.3                 | 58.3                           | 0.00465                              | 7.48                                     |                                                                  |  |  |  |
| 3/8"                                                                             | 0.00                                     | 0.00                   | 100.0                | Fondo/ Pain                                          | --                                       | --                              | --                   | --                             | 0.00332                              | 4.54                                     |                                                                  |  |  |  |
| #4                                                                               | 5.20                                     | 1.93                   | 98.1                 |                                                      | --                                       | --                              | --                   | --                             | 0.00235                              | 4.54                                     |                                                                  |  |  |  |
| Fondo / Pan                                                                      | --                                       | -                      | -                    | Peso Muestra Total Seca/ Total Weight Dry Sample     |                                          |                                 |                      | 269.8 g                        | 0.00                                 | 1.60                                     |                                                                  |  |  |  |
| Peso Muestra Total Seca/ Total Weightr Dry Sample                                |                                          | ---                    |                      | Peso Seco Después de Lavado/ Dry Weight after washed |                                          |                                 |                      |                                | --                                   | --                                       |                                                                  |  |  |  |
| % GRAVA / %GRAVEL:                                                               |                                          | 1.90                   |                      | % ARENA / % SAND                                     |                                          | 39.80                           |                      | % FINOS / % FINE               |                                      | 58.30                                    |                                                                  |  |  |  |

| Equipo utilizado para Análisis Granulométrico / Equipment Used for Particle Size Distribution |           |                     |                   |            |                     |
|-----------------------------------------------------------------------------------------------|-----------|---------------------|-------------------|------------|---------------------|
| Equipo/Equipment:                                                                             | Horno     | No. Serie/Serial #: | Equipo/Equipment: | Balanza 2  | No. Serie/Serial #: |
| Equipo/Equipment:                                                                             | Balanza 1 | No. Serie/Serial #: | Equipo/Equipment: | Tamizadora | No. Serie/Serial #: |
|                                                                                               |           | 1573                |                   |            | 552                 |

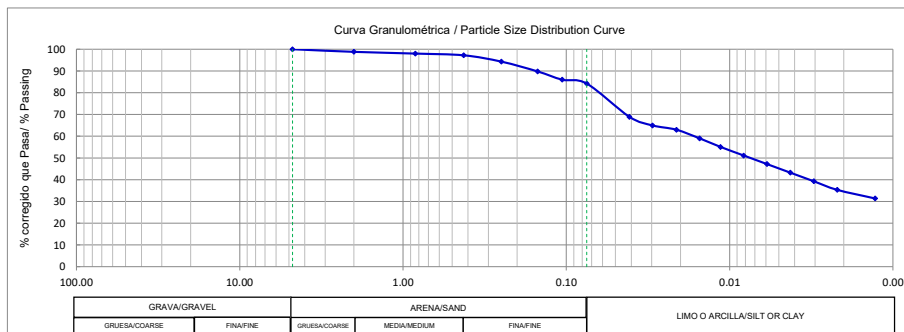
| Procedimiento Para Obtener Especimen /<br>Procedure Uses To Obtain The Specimens |        |        |        | Húmedo/<br>Moist                   | X      | Horno<br>/OVEN                | Contenido de Humedad<br>As-received water content                                                    |  | - |  | * Límite Plástico/ Plastic Limit:Enrollado a Mano / Hand Rolled<br>*Límite Líquido/Liquid Limit: Equipo Manual/ Apparatus Manual |
|----------------------------------------------------------------------------------|--------|--------|--------|------------------------------------|--------|-------------------------------|------------------------------------------------------------------------------------------------------|--|---|--|----------------------------------------------------------------------------------------------------------------------------------|
| LÍMITE LÍQUIDO/LIQUID LIMIT                                                      |        |        |        |                                    |        | LÍMITE PLÁSTICO/PLASTIC LIMIT |                                                                                                      |  |   |  |                                                                                                                                  |
| Ensayo No./ Test N°                                                              | 1      | 2      | 3      | Ensayo No./ Test N°                | 1      | 2                             | <div><div>Cont. Humedad % / Water content %</div><div>Número de Golpes / Number of Blows</div></div> |  |   |  |                                                                                                                                  |
| Cápsula No./ Can N°                                                              | A1     | B6     | 01     | Cápsula No./ Can N°                | X3     | X26                           |                                                                                                      |  |   |  |                                                                                                                                  |
| Peso Cápsula/ Mass of Can (g)                                                    | 10.210 | 11.360 | 10.410 | Peso Cápsula/ Mass of Can (g)      | 9.260  | 8.310                         |                                                                                                      |  |   |  |                                                                                                                                  |
| Cap + Suelo Hum/ Can+wet soil (g)                                                | 27.610 | 28.410 | 29.700 | Cap + Suelo Hum/ Can+wet soil (g)  | 13.210 | 16.360                        |                                                                                                      |  |   |  |                                                                                                                                  |
| Cap + Suelo Seco/ Can+Dry Soil (g)                                               | 22.020 | 22.770 | 22.990 | Cap + Suelo Seco/ Can+Dry Soil (g) | 12.220 | 14.350                        |                                                                                                      |  |   |  |                                                                                                                                  |
| Agua/ Water (g)                                                                  | 5.590  | 5.640  | 6.710  | Agua/ water (g)                    | 0.990  | 2.010                         |                                                                                                      |  |   |  |                                                                                                                                  |
| Suelo Seco/ Dry Soil (g)                                                         | 11.810 | 11.410 | 12.580 | Suelo Seco/ Dry Soil (g)           | 2.960  | 6.040                         |                                                                                                      |  |   |  |                                                                                                                                  |
| Cont. Humedad % / Water content %                                                | 47.300 | 49.400 | 53.300 | Cont. Humedad % / Water content %  | 33.400 | 33.300                        |                                                                                                      |  |   |  |                                                                                                                                  |
| # de Golpes / # of Blows                                                         | 35     | 26     | 16     | Promedio/ Average                  | 33.350 |                               |                                                                                                      |  |   |  |                                                                                                                                  |



| Equipo utilizado para Límites de Atterberg / Equipment used for Atterberg Limits |         |                     |      |                   |       |
|----------------------------------------------------------------------------------|---------|---------------------|------|-------------------|-------|
| Equipo/Equipment:                                                                | Balanza | No. Serie/Serial #: | 1573 | Equipo/Equipment: | Horno |
| Equipo/Equipment:                                                                |         | No. Serie/Serial #: |      | Equipo/Equipment: |       |
|                                                                                  |         |                     |      |                   | 896   |
| Observaciones/ Remarks:                                                          |         |                     |      |                   |       |

Muestreado en Campo por/ Sampled on site by: A. Nieto  
Ensayado por / Tested by: O. Estrada  
Compilado por / Compiled by: A. Hernández  
Presentado por/ Presented by: Tecnilab, S.A.

|                      |             |
|----------------------|-------------|
| HOYO No./ HOLE #:    | 4           |
| MUESTRA/SAMPLE:      | 15          |
| PROFUNDIDAD/DEPTH:   | 21.00-21.45 |
| ELEVACIÓN/ELEVATION: | -           |
| MATERIAL/MATERIAL:   | SUELO       |
| FUENTE / SOURCE :    | SPT         |



| RESUMEN/ SUMMARY                                 |    |                |     |
|--------------------------------------------------|----|----------------|-----|
| L. L.                                            | 66 | C <sub>u</sub> | --- |
| P. L.                                            | 33 | C <sub>c</sub> | --- |
| P. I.                                            | 33 |                |     |
| CLASIFICACIÓN S.U.C/S/U.C.S. CLASSIFICATION      |    |                |     |
| MH                                               |    |                |     |
| Limo Elástico Con Arena / Elastic Silt With Sand |    |                |     |
| CLASIFICACIÓN AASHTO/ AASHTO CLASSIFICATION      |    |                |     |
| CLASIFICACIÓN / CLASSIFICATION                   |    | A-7-5          |     |
| ÍNDICE DE GRUPO/GROUP INDEX                      |    | 32             |     |
| OBSERVACIONES/ REMARKS:                          |    |                |     |

|                                                                                  |                                          |                                 |                      |                                                                                                  |                                          |                        |                      |                               |                                      |                                        |
|----------------------------------------------------------------------------------|------------------------------------------|---------------------------------|----------------------|--------------------------------------------------------------------------------------------------|------------------------------------------|------------------------|----------------------|-------------------------------|--------------------------------------|----------------------------------------|
| Procedimiento Para Obtener Especimen:<br>Procedure Uses To Obtain The Specimens: |                                          | Secado al Horno /<br>Oven dried |                      | MÉTODO USADO / TEST METHOD USED <input type="checkbox"/> A <input checked="" type="checkbox"/> B |                                          |                        |                      |                               |                                      |                                        |
| AGREGADO GRUESO/COARSE AGGREGATE                                                 |                                          |                                 |                      | AGREGADO FINO/FINE AGGREGATE                                                                     |                                          |                        |                      |                               | *HIDRÓMETRO/HYDROMETER ASTM D 7928   |                                        |
| TAMIZ / SIEVE                                                                    | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED          | % PASAJE / % PASSING | TAMIZ / SIEVE                                                                                    | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED | % PASAJE / % PASSING | % CORR. PASAJE/ CORR. PASSING | DIÁMETRO DE PARTÍCULA/ PARTICLE SIZE | CORREGIDO QUE PASAJE CORRECTED PASSING |
| 4"                                                                               |                                          | ---                             | ---                  | #4                                                                                               | 0.00                                     | 0.00                   | 100.0                | 100.0                         | 0.04108                              | 68.92                                  |
| 3"                                                                               |                                          | ---                             | ---                  | #10                                                                                              | 2.60                                     | 1.20                   | 98.8                 | 98.8                          | 0.02967                              | 64.96                                  |
| 2 1/2"                                                                           |                                          | ---                             | ---                  | #20                                                                                              | 4.30                                     | 2.00                   | 98.0                 | 98.0                          | 0.02120                              | 62.99                                  |
| 2"                                                                               |                                          | ---                             | ---                  | #40                                                                                              | 5.90                                     | 2.80                   | 97.2                 | 97.2                          | 0.01529                              | 59.04                                  |
| 1 1/2"                                                                           |                                          | ---                             | ---                  | #60                                                                                              | 12.20                                    | 5.70                   | 94.3                 | 94.3                          | 0.01138                              | 55.08                                  |
| 1"                                                                               |                                          | ---                             | ---                  | #100                                                                                             | 21.80                                    | 10.20                  | 89.8                 | 89.8                          | 0.00820                              | 51.13                                  |
| 3/4"                                                                             |                                          | ---                             | ---                  | #140                                                                                             | 29.80                                    | 14.00                  | 86.0                 | 86.0                          | 0.00590                              | 47.18                                  |
| 1/2"                                                                             |                                          | ---                             | ---                  | #200                                                                                             | 33.60                                    | 15.80                  | 84.2                 | 84.2                          | 0.00425                              | 43.23                                  |
| 3/8"                                                                             |                                          | ---                             | ---                  | Fondo/ Pain                                                                                      | --                                       | --                     | --                   | --                            | 0.00305                              | 39.28                                  |
| #4                                                                               |                                          | 0.00                            | 100.0                |                                                                                                  | --                                       | --                     | --                   | --                            | 0.00219                              | 35.33                                  |
| Fondo / Pan                                                                      | --                                       | -                               | -                    | Peso Muestra Total Seca/ Total Weight Dry Sample                                                 |                                          |                        |                      | 212.8 g                       | 0.00129                              | 31.37                                  |
| Peso Muestra Total Seca/ Total Weigh Dry Sample                                  |                                          | ---                             |                      | Peso Seco Después de Lavado/ Dry Weight after washed                                             |                                          |                        |                      |                               | --                                   | --                                     |
| % GRAVA / % GRAVEL:                                                              |                                          | 0.00                            |                      | % ARENA / % SAND                                                                                 |                                          | 15.80                  |                      | % FINOS / % FINE              |                                      | 84.20                                  |

| Equipo utilizado para Análisis Granulométrico / Equipment Used for Particle Size Distribution |           |                     |      |                   |            |                     |
|-----------------------------------------------------------------------------------------------|-----------|---------------------|------|-------------------|------------|---------------------|
| Equipo/Equipment:                                                                             | Horno     | No. Serie/Serial #: |      | Equipo/Equipment: | Balanza 2  | No. Serie/Serial #: |
| Equipo/Equipment:                                                                             | Balanza 1 | No. Serie/Serial #: | 1573 | Equipo/Equipment: | Tamizadora | No. Serie/Serial #: |
|                                                                                               |           |                     |      |                   |            | 552                 |

|                                                                                  |                   |        |                |                                                   |        |        |                                                                                                                                     |
|----------------------------------------------------------------------------------|-------------------|--------|----------------|---------------------------------------------------|--------|--------|-------------------------------------------------------------------------------------------------------------------------------------|
| Procedimiento Para Obtener Especimen /<br>Procedure Uses To Obtain The Specimens | Húmedo /<br>Moist | X      | Horno<br>/OVEN | Contenido de Humedad<br>As-received water content | -      |        | * Límite Plástico/ Plastic Limit: Enrollado a Mano / Hand Rolled<br>* Límite Líquido/ Liquid Limit: Equipo Manual/ Apparatus Manual |
| <b>LÍMITE LÍQUIDO/ LIQUID LIMIT</b>                                              |                   |        |                | <b>LÍMITE PLÁSTICO/ PLASTIC LIMIT</b>             |        |        |                                                                                                                                     |
| Ensayo No./ Test N°                                                              | 1                 | 2      | 3              | Ensayo No./ Test N°                               | 1      | 2      |                                                                                                                                     |
| Cápsula No./ Can N°                                                              | A6                | B8     | C2             | Cápsula No./ Can N°                               | XX1    | X26    |                                                                                                                                     |
| Peso Cápsula/ Mass of Can (g)                                                    | 10.210            | 11.310 | 10.410         | Peso Cápsula/ Mass of Can (g)                     | 9.260  | 8.310  |                                                                                                                                     |
| Cap + Suelo Hum/ Can+wet soil (g)                                                | 29.610            | 28.410 | 27.610         | Cap + Suelo Hum/ Can+wet soil (g)                 | 17.610 | 16.210 |                                                                                                                                     |
| Cap + Suelo Seco/ Can+Dry Soil (g)                                               | 22.090            | 21.590 | 20.570         | Cap + Suelo Seco/ Can+Dry Soil (g)                | 15.530 | 14.230 |                                                                                                                                     |
| Agua/ Water (g)                                                                  | 7.520             | 6.820  | 7.040          | Agua/ water (g)                                   | 2.080  | 1.980  |                                                                                                                                     |
| Suelo Seco/ Dry Soil (g)                                                         | 11.880            | 10.280 | 10.160         | Suelo Seco/ Dry Soil (g)                          | 6.270  | 5.920  |                                                                                                                                     |
| Cont. Humedad % / Water content %                                                | 63.300            | 66.300 | 69.300         | Cont. Humedad % / Water content %                 | 33.200 | 33.400 |                                                                                                                                     |
| # de Golpes / # of Blows                                                         | 35                | 26     | 16             | Promedio/ Average                                 | 33.300 |        |                                                                                                                                     |

| Equipo utilizado para Límites de Atterberg / Equipment used for Atterberg Limits |         |                     |      |                   |       |                     |     |
|----------------------------------------------------------------------------------|---------|---------------------|------|-------------------|-------|---------------------|-----|
| Equipo/Equipment:                                                                | Balanza | No. Serie/Serial #: | 1573 | Equipo/Equipment: | Horno | No. Serie/Serial #: | 896 |
| Equipo/Equipment:                                                                |         | No. Serie/Serial #: |      | Equipo/Equipment: |       | No. Serie/Serial #: |     |

|                         |  |
|-------------------------|--|
| Observaciones/ Remarks: |  |
|-------------------------|--|

|                                              |            |                               |                |
|----------------------------------------------|------------|-------------------------------|----------------|
| Muestreado en Campo por/ Sampled on site by: | J. Cedeño  | Compilado por / Compiled by:  | A. Hernández   |
| Ensayado por / Tested by :                   | O. Estrada | Presentado por/ Presented by: | Tecnilab, S.A. |

Versión: 12

Fecha de Revisión: 20-abril-2023

AVENIDA PRIMERA PARQUE LEFEVRE - No.15-6 EDIFICIO TECNILAB / APARTADO 0834-02414, PANAMÁ, REPÚBLICA DE PANAMÁ - TELÉFONOS: 224-9896, 224-3567

\* El ensayo Clasificación de suelos ASTM D 2487 no se encuentra en el alcance de la acreditación

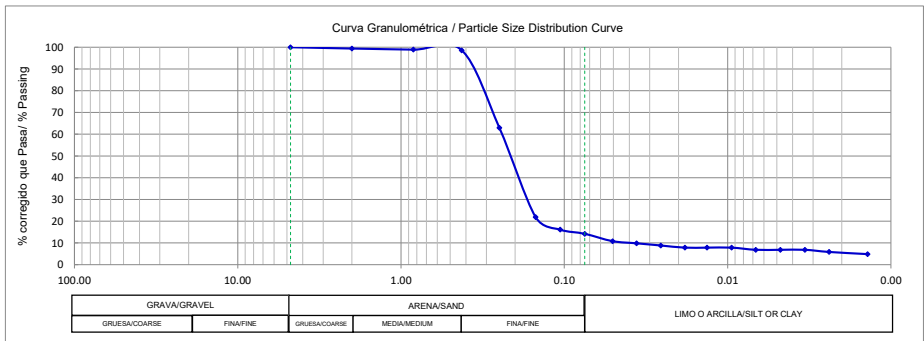
**F-060**

**Área/Area:**  
Pruebas y Ensayos/ Test and Trials

**Nro. Informe / Report No.**  
**18400-1AG-2024**

TRABAJO Nro./ JOB #: 2-1259 CLIENTE/ CLIENT: SFERA PROPERTIES CORP  
PROYECTO/PROJECT: CAVAROSA  
LOCALIZACIÓN / LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
MUESTREADO POR / SAMPLED BY: TECNILAB, S.A. FECHA/DATE: 02/03/24  
FECHA DE RECEPCIÓN / RECEPCIÓN DATE: 4-mar-24 FECHA DE ENSAYO / TEST DATE: 7-mar-24  
MÉTODO DE MUESTREO/ ESTÁNDAR PRACTICE FOR SAMPLING: ASTM D 4220 FECHA DE REPORTE/REPORT DATE: 8-mar-24

HOYO No./ HOLE #: 5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/DEPTH: 18.00-18.90  
ELEVACIÓN/ELEVATION: -  
MATERIAL/MATERIAL: SUELO  
FUENTE / SOURCE: SHELBY



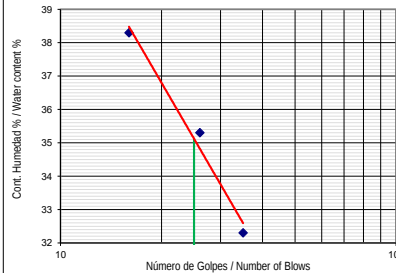
| RESUMEN/ SUMMARY                             |    |                |     |
|----------------------------------------------|----|----------------|-----|
| L. L.                                        | 35 | C <sub>u</sub> | --- |
| P. L.                                        | 25 | C <sub>c</sub> | --- |
| P. I.                                        | 10 |                |     |
| CLASIFICACIÓN S.U.C.S./U.C.S. CLASSIFICATION |    |                |     |
| SM                                           |    |                |     |
| Arena Limosa/ Silty Sand                     |    |                |     |
| CLASIFICACIÓN AASHTO/ AASHTO CLASSIFICATION  |    |                |     |
| CLASIFICACIÓN / CLASSIFICATION A-2-4         |    |                |     |
| ÍNDICE DE GRUPO/GROUP INDEX 0                |    |                |     |
| OBSERVACIONES/ REMARKS:                      |    |                |     |

| Procedimiento Para Obtener Especimen:<br>Procedure Uses To Obtain The Specimens: |                                          |                        |                     | Secado al Horno /<br>Oven dried                      |                                          | MÉTODO USADO / TEST METHOD USED |                     |                               |  |                                      |                                         | <input type="checkbox"/> A <input checked="" type="checkbox"/> B |  |  |  |
|----------------------------------------------------------------------------------|------------------------------------------|------------------------|---------------------|------------------------------------------------------|------------------------------------------|---------------------------------|---------------------|-------------------------------|--|--------------------------------------|-----------------------------------------|------------------------------------------------------------------|--|--|--|
| AGREGADO GRUESO/COARSE AGGREGATE                                                 |                                          |                        |                     | AGREGADO FINO/FINE AGGREGATE                         |                                          |                                 |                     |                               |  | *HIDRÓMETRO/HYDROMETER ASTM D 7928   |                                         |                                                                  |  |  |  |
| TAMIZ / SIEVE                                                                    | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED | % PASAJE/ % PASSING | TAMIZ / SIEVE                                        | RETENIDO ACUMULADO/ ACCUMULATED RETAINED | % RETENIDO/ % RETAINED          | % PASAJE/ % PASSING | % CORR. PASAJE/ CORR. PASSING |  | DIAMETRO DE PARTICULA/ PARTICLE SIZE | CORREGIDO QUE PASAJE/ CORRECTED PASSING |                                                                  |  |  |  |
| 4"                                                                               |                                          | ---                    | ---                 | #4                                                   | 0.00                                     | 0.00                            | 100.0               | 100.0                         |  | 0.05068                              | 10.81                                   |                                                                  |  |  |  |
| 3"                                                                               |                                          | ---                    | ---                 | #10                                                  | 1.50                                     | 0.60                            | 99.4                | 99.4                          |  | 0.03609                              | 9.82                                    |                                                                  |  |  |  |
| 2 1/2"                                                                           |                                          | ---                    | ---                 | #20                                                  | 2.60                                     | 1.10                            | 98.9                | 98.9                          |  | 0.02570                              | 8.82                                    |                                                                  |  |  |  |
| 2"                                                                               |                                          | ---                    | ---                 | #40                                                  | 3.20                                     | 1.40                            | 98.6                | 98.6                          |  | 0.01830                              | 7.83                                    |                                                                  |  |  |  |
| 1 1/2"                                                                           |                                          | ---                    | ---                 | #60                                                  | 85.50                                    | 37.00                           | 63.0                | 63.0                          |  | 0.01336                              | 7.83                                    |                                                                  |  |  |  |
| 1"                                                                               |                                          | ---                    | ---                 | #100                                                 | 180.40                                   | 78.10                           | 21.9                | 21.9                          |  | 0.00945                              | 7.83                                    |                                                                  |  |  |  |
| 3/4"                                                                             |                                          | ---                    | ---                 | #140                                                 | 193.90                                   | 83.90                           | 16.1                | 16.1                          |  | 0.00673                              | 6.84                                    |                                                                  |  |  |  |
| 1/2"                                                                             |                                          | ---                    | ---                 | #200                                                 | 198.30                                   | 85.80                           | 14.2                | 14.2                          |  | 0.00476                              | 6.84                                    |                                                                  |  |  |  |
| 3/8"                                                                             |                                          | ---                    | ---                 | Fondo/ Pain                                          | --                                       | --                              | --                  | --                            |  | 0.00336                              | 6.84                                    |                                                                  |  |  |  |
| #4                                                                               |                                          | 0.00                   | 100.0               |                                                      | --                                       | --                              | --                  | --                            |  | 0.00239                              | 5.84                                    |                                                                  |  |  |  |
| Fondo / Pan                                                                      | --                                       | -                      | -                   | Peso Muestra Total Seca/ Total Weight Dry Sample     |                                          |                                 |                     | 231 g                         |  | 0.00139                              | 4.85                                    |                                                                  |  |  |  |
| Peso Muestra Total Seca/ Total Weighg Dry Sample                                 |                                          | ---                    |                     | Peso Seco Después de Lavado/ Dry Weight after washed |                                          |                                 |                     |                               |  | --                                   | --                                      |                                                                  |  |  |  |
| % GRAVA / %GRAVEL:                                                               |                                          | 0.00                   |                     | % ARENA / % SAND                                     |                                          | 85.80                           |                     | % FINOS / % FINE              |  | 14.20                                |                                         |                                                                  |  |  |  |

| Equipo utilizado para Análisis Granulométrico / Equipment Used for Particle Size Distribution |           |                     |                   |            |                     |
|-----------------------------------------------------------------------------------------------|-----------|---------------------|-------------------|------------|---------------------|
| Equipo/Equipment:                                                                             | Horno     | No. Serie/Serial #: | Equipo/Equipment: | Balanza 2  | No. Serie/Serial #: |
| Equipo/Equipment:                                                                             | Balanza 1 | No. Serie/Serial #: | Equipo/Equipment: | Tamizadora | No. Serie/Serial #: |
|                                                                                               |           | 1573                |                   |            | 552                 |

| Procedimiento Para Obtener Especimen /<br>Procedure Uses To Obtain The Specimens |        |        |        | Húmedo/<br>Moist                   | X      | Horno<br>/OVEN | Contenido de Humedad<br>As-received water content |  | * Límite Plástico/ Plastic Limit:Enrollado a Mano / Hand Rolled<br>*Límite Líquido/Liquid Limit: Equipo Manual/ Apparatus Manual |  |  |
|----------------------------------------------------------------------------------|--------|--------|--------|------------------------------------|--------|----------------|---------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------|--|--|
| LÍMITE LÍQUIDO/LIQUID LIMIT                                                      |        |        |        | LÍMITE PLÁSTICO/PLASTIC LIMIT      |        |                |                                                   |  |                                                                                                                                  |  |  |
| Ensayo No./ Test Nº                                                              | 1      | 2      | 3      | Ensayo No./ Test Nº                | 1      | 2              |                                                   |  |                                                                                                                                  |  |  |
| Cápsula No./ Can Nº                                                              | A6     | B7     | C2     | Cápsula No./ Can Nº                | A1     | A3             |                                                   |  |                                                                                                                                  |  |  |
| Peso Cápsula/ Mass of Can (g)                                                    | 10.210 | 11.360 | 11.410 | Peso Cápsula/ Mass of Can (g)      | 9.100  | 8.310          |                                                   |  |                                                                                                                                  |  |  |
| Cap + Suelo Hum/ Can+wet soil (g)                                                | 29.610 | 28.310 | 29.630 | Cap + Suelo Hum/ Can+wet soil (g)  | 16.310 | 15.230         |                                                   |  |                                                                                                                                  |  |  |
| Cap + Suelo Seco/ Can+dry Soil (g)                                               | 24.870 | 23.890 | 24.580 | Cap + Suelo Seco/ Can+dry Soil (g) | 14.850 | 13.830         |                                                   |  |                                                                                                                                  |  |  |
| Agua/ Water (g)                                                                  | 4.740  | 4.420  | 5.050  | Agua/ water (g)                    | 1.460  | 1.400          |                                                   |  |                                                                                                                                  |  |  |
| Suelo Seco/ Dry Soil (g)                                                         | 14.660 | 12.530 | 13.170 | Suelo Seco/ Dry Soil (g)           | 5.750  | 5.520          |                                                   |  |                                                                                                                                  |  |  |
| Cont. Humedad % / Water content %                                                | 32.300 | 35.300 | 38.300 | Cont. Humedad % / Water content %  | 25.400 | 25.400         |                                                   |  |                                                                                                                                  |  |  |
| # de Golpes / # of Blows                                                         | 35     | 26     | 16     | Promedio/ Average                  | 25.400 |                |                                                   |  |                                                                                                                                  |  |  |

Cont. Humedad % / Water content %



| Equipo utilizado para Límites de Atterberg / Equipment used for Atterberg Limits |         |                     |      |                   |       |
|----------------------------------------------------------------------------------|---------|---------------------|------|-------------------|-------|
| Equipo/Equipment:                                                                | Balanza | No. Serie/Serial #: | 1573 | Equipo/Equipment: | Horno |
| Equipo/Equipment:                                                                |         | No. Serie/Serial #: |      | Equipo/Equipment: |       |
|                                                                                  |         |                     |      |                   | 896   |
| Observaciones/ Remarks:                                                          |         |                     |      |                   |       |

Muestreado en Campo por/ Sampled on site by: A. Nieto  
Ensayado por / Tested by: O. Estrada  
Compilado por / Compiled by: A. Hernández  
Presentado por/ Presented by: Tecnilab, S.A.

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST  
 ASTM D 2435**

**F-091**

Fecha Efectiva:  
15 de Abril de 2011

Area:  
Pruebas y Ensayos

Versión:  
0

Página:  
1 de 1

TRABAJO No./JOB No.  
 CLIENTE/CLIENT:  
 PROYECTO/ PROJECT:

2-1259

SPERFA PROPERTIES CORP

CAVAROSA

LOCALIZACION/ LOCATION:  
 METODO/METHOD:

CALZADA DE AMADOR, CIUDAD DE PANAMA

A

SONDEO/ BEROHOLE.:  
 MUESTRA/SAMPLE:  
 PROFUNDIDAD/ DEPTH:  
 FECHA/ DATE:  
 TECNICO/ TECHNICIAN:

H3

1

21.00-21.90 m

20-Mar-24

C. CORDOBA

**DATOS INICIALES/ INITIAL DATA:**

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Altura inicial del suelo/ Initial height of soil, Hi (cm)               | 2.54  |
| Diámetro del suelo/ Diameter of soil, d (cm)                            | 6.35  |
| Gravedad Específica del suelo/ Specific Gravity, Gs                     | 2.65  |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )                      | 31.67 |
| Volumen inicial del suelo/ Initial volume of soil, V (cm <sup>3</sup> ) | 80.44 |

**DATOS DE MUESTRA/SAMPLE DATA**

ESTRUCTURA/STRUCTURE:  
 DESCRIPCION/DESCRIPTION:

HOMOGÉNEA

| Contenido de humedad inicial de las taras/ Water Content from tares |       |       |
|---------------------------------------------------------------------|-------|-------|
| Tara No./ Tare No.                                                  | 185   | 185   |
| Tara + suelo húmedo/ Tare + Wet Soil, g                             | 164.4 | 164.4 |
| Peso de tara/ Tare mass, g                                          | 18.8  | 18.8  |
| Tara + suelo seco/ Tare + dry soil, g                               | 123.4 | 123.4 |
| Contenido de humedad/ Water Content, w (%)                          | 39.20 | 39.20 |
| Contenido de humedad promedio/ Average water content (%)            | 39.20 |       |

**HUMEDAD INICIAL/ INITIAL WATER CONTENT**

|                                                                    |        |
|--------------------------------------------------------------------|--------|
| Peso del anillo + probeta húmeda/ Ring + wet soil (g)              | 331.50 |
| Peso del anillo/ Ring mass (g)                                     | 194.00 |
| Peso del suelo húmedo/ Wet soil mass (g)                           | 137.50 |
| Peso del suelo seco/ Dry Soil mass, Ws (g)                         | 91.80  |
| Contenido de humedad inicial/ Initial water content of soil, ω (%) | 49.78  |
| Grado de saturación inicial/ Initial degree of saturation, Si (%)  | 99.79  |

**HUMEDAD FINAL/ FINAL WATER CONTENT**

|                                                                 |        |
|-----------------------------------------------------------------|--------|
| Vidrio + Anillo + Probeta húmeda final/ Glass+Ring+wet soil (g) | 380.20 |
| Vidrio + Anillo + Probeta seca final/ Glass+ring+ dry soil (g)  | 336.80 |
| Peso del agua final/ Water mass, Wwf (g)                        | 43.40  |
| Volumen de agua final/ Volume of water Vwf (cm <sup>3</sup> )   | 43.40  |
| Peso del vidrio/ Glass mass, (g)                                | 51.00  |
| Peso del suelo seco/ Dry Soil mass, Ws (g)                      | 91.80  |
| Contenido de humedad final/ Final water content of soil, ωf (%) | 47.28  |

Deformación total de la muestra/ Total displacement of soil, ΔH (cm): 0.189738

**RESULTADOS/ RESULT**

|                                                                         |        |
|-------------------------------------------------------------------------|--------|
| Altura de sólidos calculada/ Calculated height of solids, Hs (cm)       | 1.094  |
| Altura inicial de vacíos/ Initial height of voids, Hvi (cm)             | 1.446  |
| Relación de vacíos inicial/ Initial Void Ratio, ei                      | 1.322  |
| Altura final de vacíos/ Final height of voids, Hvf (cm)                 | 1.256  |
| Relación de vacíos final/ Final Void ratio, ef                          | 1.149  |
| Grado de saturación final/ Final degree of saturation (assumed), Sf (%) | 100.00 |
| Contenido de humedad final/ Final water content, ωf (%)                 | 47.28  |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L.NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMA  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

| Load or the Weights<br>(kg) | Applied Load<br>(kg) | Applied Stress<br>(kg/cm2) | Applied Stress<br>(kPa) | Deformation at the end of each increment<br>(mm) | Accumulate Deformation<br>(mm) | Accumulate Deformation<br>$\Delta H$ ( $\mu$ ) | Strain Deformation<br>$\epsilon = \Delta H/H_0 \times 100$ | $\Delta \epsilon = \Delta H/H_0$ | and instantaneous | Compressibility Coefficient<br>$av$ (m2/MN) | Volumetric Compressibility Coefficient<br>$mv$ (m2/MN) | $\Delta H_{50}$<br>(mm) | $H_{50}$<br>(cm) | $H_{d50}$<br>(cm) | $(t90)^{0.5}$<br>(min <sup>0.5</sup> ) | t90<br>(min) | Consolidation Coefficient<br>$cv$ (cm2/seg) |
|-----------------------------|----------------------|----------------------------|-------------------------|--------------------------------------------------|--------------------------------|------------------------------------------------|------------------------------------------------------------|----------------------------------|-------------------|---------------------------------------------|--------------------------------------------------------|-------------------------|------------------|-------------------|----------------------------------------|--------------|---------------------------------------------|
| 0.00                        | 0.00                 | 0.00                       | 0.00                    | 0.000                                            | 0.00                           | 0.00                                           | 0.00                                                       | 0.00                             | 1.32              | 0.00                                        | 0.00                                                   | 0.00                    | 2.54             | 1.27              | --                                     | --           |                                             |
| 0.50                        | 4.41                 | 0.14                       | 13.66                   | 0.025                                            | 0.03                           | 0.00                                           | 0.10                                                       | 0.00                             | 1.32              | 0.17                                        | 0.07                                                   | 0.01                    | 2.54             | 1.27              | 0.81                                   | 0.66         | 3.44E-02                                    |
| 1.00                        | 8.82                 | 0.28                       | 27.32                   | 0.064                                            | 0.09                           | 0.01                                           | 0.35                                                       | 0.01                             | 1.31              | 0.43                                        | 0.18                                                   | 0.02                    | 2.54             | 1.27              | 2.04                                   | 4.14         | 5.49E-03                                    |
| 2.00                        | 17.64                | 0.56                       | 54.63                   | 0.193                                            | 0.28                           | 0.03                                           | 1.11                                                       | 0.03                             | 1.30              | 0.65                                        | 0.28                                                   | 0.04                    | 2.53             | 1.26              | 1.93                                   | 3.74         | 6.04E-03                                    |
| 4.00                        | 35.28                | 1.11                       | 109.27                  | 0.620                                            | 0.90                           | 0.09                                           | 3.55                                                       | 0.08                             | 1.24              | 1.04                                        | 0.45                                                   | 0.19                    | 2.49             | 1.25              | 4.00                                   | 16.00        | 1.37E-03                                    |
| 8.00                        | 70.56                | 2.23                       | 218.53                  | 0.879                                            | 1.78                           | 0.18                                           | 7.01                                                       | 0.16                             | 1.16              | 0.74                                        | 0.32                                                   | 0.27                    | 2.42             | 1.21              | 4.68                                   | 21.93        | 9.46E-04                                    |
| 16.00                       | 141.12               | 4.46                       | 437.06                  | 1.118                                            | 2.90                           | 0.29                                           | 11.41                                                      | 0.26                             | 1.06              | 0.47                                        | 0.20                                                   | 0.34                    | 2.33             | 1.16              | 4.60                                   | 21.13        | 9.06E-04                                    |
| 8.00                        | 70.56                | 2.23                       | 218.53                  | -0.074                                           | 2.82                           | 0.28                                           | 11.12                                                      | 0.26                             | 1.06              | 0.03                                        | 0.01                                                   |                         |                  |                   |                                        |              |                                             |
| 4.00                        | 35.28                | 1.11                       | 109.27                  | -0.145                                           | 2.68                           | 0.27                                           | 10.55                                                      | 0.24                             | 1.08              | 0.12                                        | 0.05                                                   |                         |                  |                   |                                        |              |                                             |
| 2.00                        | 17.64                | 0.56                       | 54.63                   | -0.185                                           | 2.49                           | 0.25                                           | 9.82                                                       | 0.23                             | 1.09              | 0.31                                        | 0.13                                                   |                         |                  |                   |                                        |              |                                             |
| 1.00                        | 8.82                 | 0.28                       | 27.32                   | -0.246                                           | 2.25                           | 0.22                                           | 8.85                                                       | 0.21                             | 1.12              | 0.82                                        | 0.36                                                   |                         |                  |                   |                                        |              |                                             |
| 0.50                        | 4.41                 | 0.14                       | 13.66                   | -0.196                                           | 2.05                           | 0.21                                           | 8.08                                                       | 0.19                             | 1.13              | 1.31                                        | 0.56                                                   |                         |                  |                   |                                        |              |                                             |
| 0.00                        | 0.00                 | 0.00                       | 0.00                    | -0.155                                           | 1.90                           | 0.19                                           | 7.47                                                       | 0.17                             | 1.15              | 1.04                                        | 0.45                                                   |                         |                  |                   |                                        |              |                                             |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L.NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No.

2-1259

SONDEO/ BEROHOLE.:

H3

CLIENTE/CLIENT:

SFERA PROPERTIES CORP

MUESTRA/SAMPLE:

1

PROYECTO/ PROJECT:

CAVAROSA

PROFUNDIDAD/ DEPTH:

21.00-21.90 m

LOCALIZACION/ LOCATION:

CALZADA DE AMADOR, CIUDAD DE PANAMA

FECHA/ DATE:

20-Mar-24

METODO/METHOD:

A

TECNICO/ TECHNICIAN:

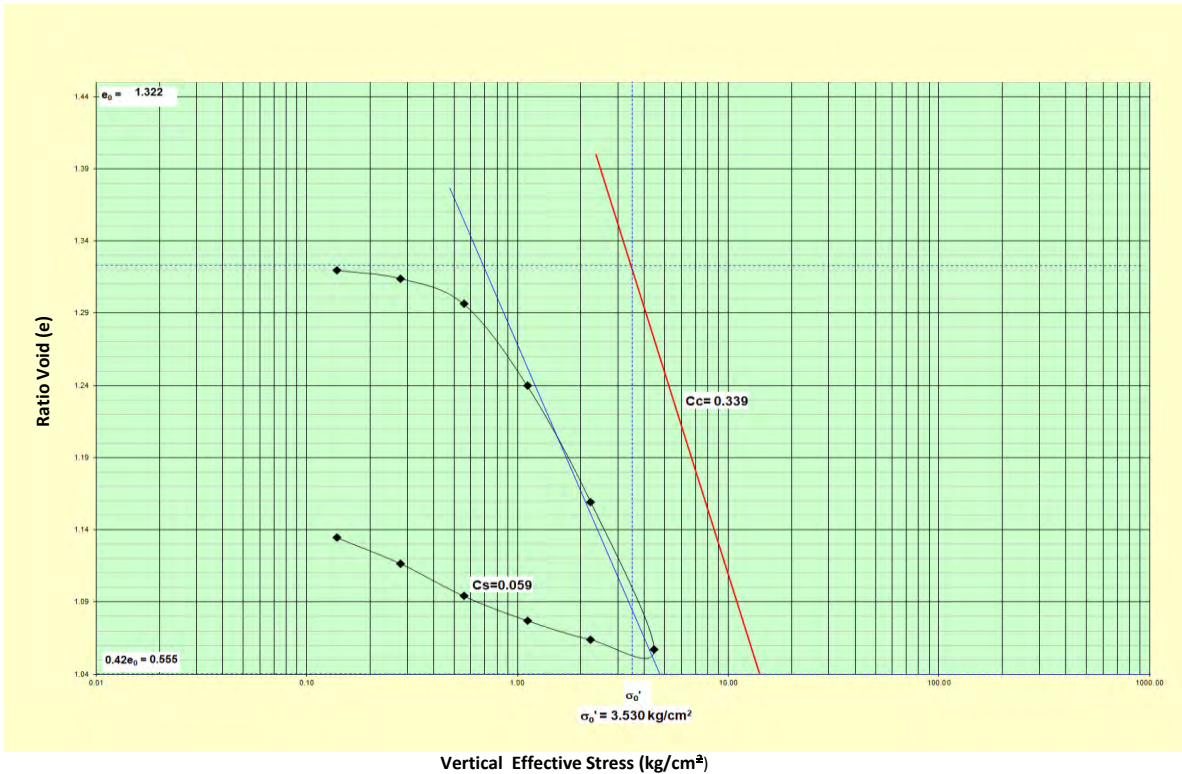
C. CORDOBA

**CONSOLIDATION CURVE**

Ring : 2

Borehole: H3

Depth: 21.00-21.90 m



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

EL MATERIAL SE ENCUENTRA NORMALMENTE CONSOLIDADO.

Ensayado por/ Tested by:  
Compilado por / Compiled by:

C. CORDOBA  
L. NAVARRO

Revisado por/ Reviewed by:  
Presentado por / Presented by:

L. NAVARRO  
L. NAVARRO

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

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**Pruebas y Ensayos**

Versión:  
**0**

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**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 13.7 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.000000           | 0                | 0.00000                  |
| 0.1        | 6              | 2.44949                       | 0.018            | 0.316228           | 0.018            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.018            | 0.500000           | 0.018            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.020            | 0.707107           | 0.020            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.020            | 1.000000           | 0.020            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.023            | 1.414214           | 0.023            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.023            | 2.000000           | 0.023            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.025            | 2.828427           | 0.025            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.025            | 3.872983           | 0.025            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.025            | 5.477226           | 0.025            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.025            | 7.745967           | 0.025            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.025            | 10.954451          | 0.025            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.025            | 15.491933          | 0.025            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.025            | 21.908902          | 0.025            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.025            | 37.947332          | 0.025            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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PROJECT:

CAVAROSA

Job No.: 2-1259

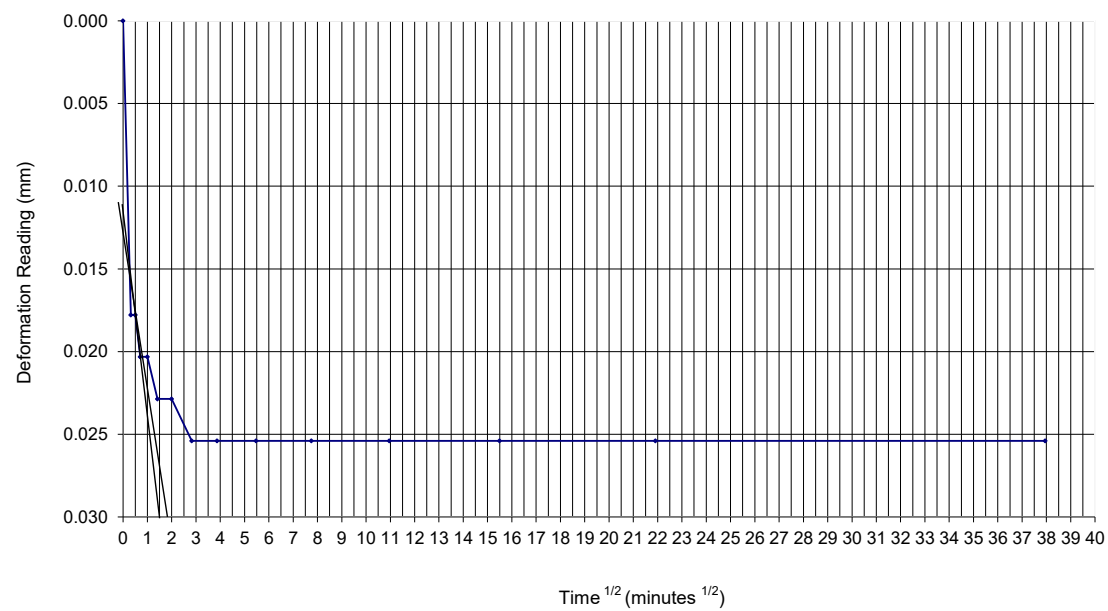
Borehole: H3

Date: 20-Mar-24

Depth: 21.00-21.90 m

Load: **14 kPa**

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST  
ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

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**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CÓRDOBA

**DATA LOADING FOR 27.3 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.00000            | 0                | 0.00000                  |
| 0.1        | 6              | 2.44949                       | 0.013            | 0.31623            | 0.013            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.018            | 0.50000            | 0.018            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.023            | 0.70711            | 0.023            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.025            | 1.00000            | 0.025            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.028            | 1.41421            | 0.028            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.030            | 2.00000            | 0.030            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.033            | 2.82843            | 0.033            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.038            | 3.87298            | 0.038            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.043            | 5.47723            | 0.043            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.048            | 7.74597            | 0.048            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.053            | 10.95445           | 0.053            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.058            | 15.49193           | 0.058            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.061            | 21.90890           | 0.061            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.064            | 37.94733           | 0.064            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CÓRDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

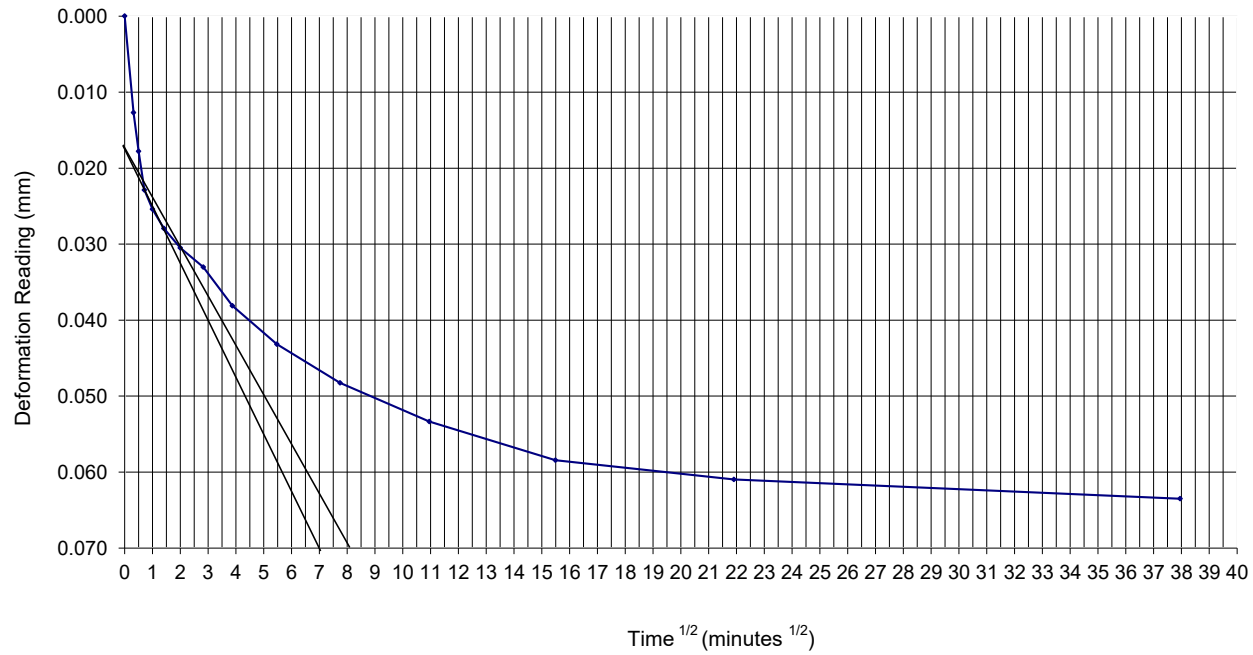
PROJECT: CAVAROSA

Job No.: 2-1259  
Borehole: H3

Date: 20-Mar-24  
Depth: 21.00-21.90 m

Load: 27 kPa

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST  
ASTM D 2435**

**F-091**

Fecha Efectiva:  
15 de Abril de 2011

Area:  
Pruebas y Ensayos

Versión:  
0

Página:  
1 de 1

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 54.6 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.0000                        | 0                | 0.00000            | 0                | 0.00000                  |
| 0.1        | 6              | 2.4495                        | 0.030            | 0.31623            | 0.030            | 0.36366                  |
| 0.25       | 15             | 3.8730                        | 0.033            | 0.50000            | 0.033            | 0.57500                  |
| 0.5        | 30             | 5.4772                        | 0.038            | 0.70711            | 0.038            | 0.81317                  |
| 1          | 60             | 7.7460                        | 0.048            | 1.00000            | 0.048            | 1.15000                  |
| 2          | 120            | 10.9545                       | 0.058            | 1.41421            | 0.058            | 1.62635                  |
| 4          | 240            | 15.4919                       | 0.066            | 2.00000            | 0.066            | 2.30000                  |
| 8          | 480            | 21.9089                       | 0.074            | 2.82843            | 0.074            | 3.25269                  |
| 15         | 900            | 30.0000                       | 0.091            | 3.87298            | 0.091            | 4.45393                  |
| 30         | 1800           | 42.4264                       | 0.112            | 5.47723            | 0.112            | 6.29881                  |
| 60         | 3600           | 60.0000                       | 0.122            | 7.74597            | 0.122            | 8.90786                  |
| 120        | 7200           | 84.8528                       | 0.140            | 10.95445           | 0.140            | 12.59762                 |
| 240        | 14400          | 120.0000                      | 0.152            | 15.49193           | 0.152            | 17.81572                 |
| 480        | 28800          | 169.7056                      | 0.170            | 21.90890           | 0.170            | 25.19524                 |
| 1440       | 86400          | 293.9388                      | 0.193            | 37.94733           | 0.193            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

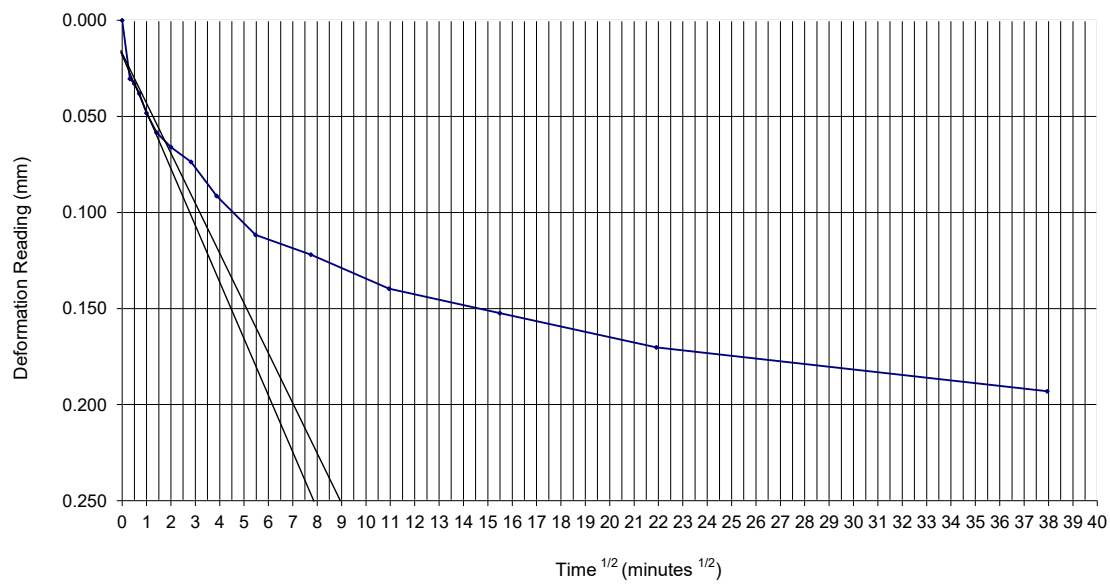
PROJECT: CAVAROSA

Job No.: 2-1259  
Borehole: H3

Date: 20-Mar-24  
Depth: 21.00-21.90 m

Load: **55 kPa**

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
 CLIENTE/CLIENT: SFERA PROPERTIES CORP  
 PROYECTO/ PROJECT CAVAROSA  
 LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
 METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
 MUESTRA/SAMPLE: 1  
 PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
 FECHA/ DATE: 20-Mar-24  
 TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 109.3 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.00000            | 0                | 0.000000                 |
| 0.1        | 6              | 2.44949                       | 0.102            | 0.31623            | 0.102            | 0.363662                 |
| 0.25       | 15             | 3.87298                       | 0.119            | 0.50000            | 0.119            | 0.575000                 |
| 0.5        | 30             | 5.47723                       | 0.137            | 0.70711            | 0.137            | 0.813173                 |
| 1          | 60             | 7.74597                       | 0.160            | 1.00000            | 0.160            | 1.150000                 |
| 2          | 120            | 10.95445                      | 0.191            | 1.41421            | 0.191            | 1.626346                 |
| 4          | 240            | 15.49193                      | 0.234            | 2.00000            | 0.234            | 2.300000                 |
| 8          | 480            | 21.90890                      | 0.290            | 2.82843            | 0.290            | 3.252691                 |
| 15         | 900            | 30.00000                      | 0.335            | 3.87298            | 0.335            | 4.453931                 |
| 30         | 1800           | 42.42641                      | 0.411            | 5.47723            | 0.411            | 6.298809                 |
| 60         | 3600           | 60.00000                      | 0.472            | 7.74597            | 0.472            | 8.907862                 |
| 120        | 7200           | 84.85281                      | 0.523            | 10.95445           | 0.523            | 12.597619                |
| 240        | 14400          | 120.00000                     | 0.546            | 15.49193           | 0.546            | 17.815723                |
| 480        | 28800          | 169.70563                     | 0.574            | 21.90890           | 0.574            | 25.195238                |
| 1440       | 86400          | 293.93877                     | 0.620            | 37.94733           | 0.620            | 43.639432                |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO

PROJECT: CAVAROSA

Job No.: 2-1259

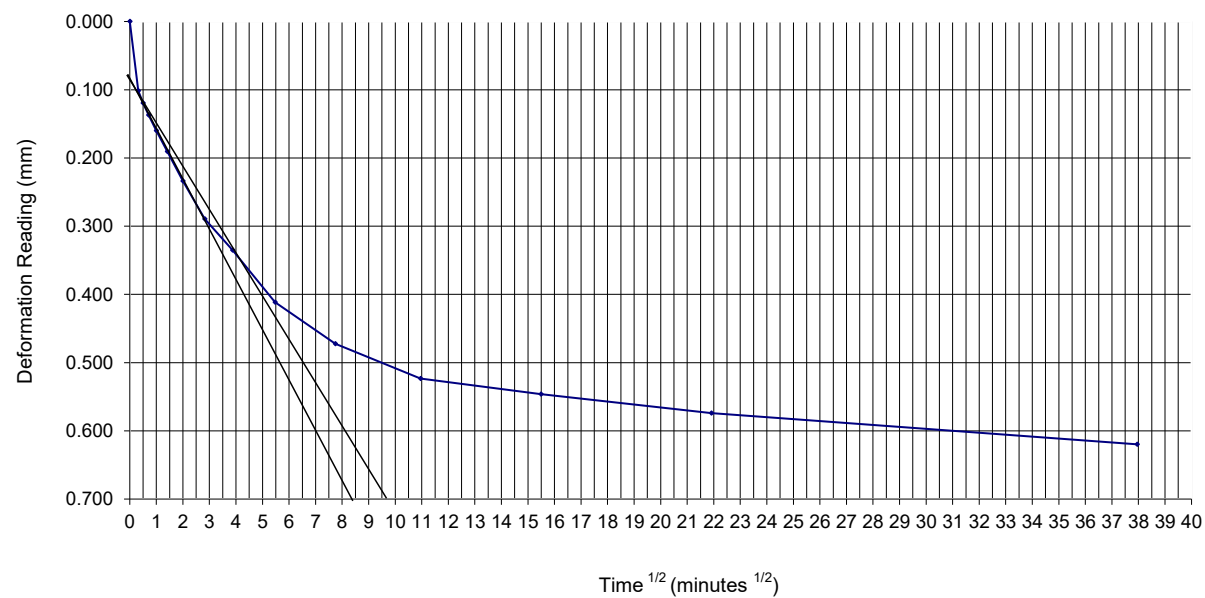
Borehole: H3

Date: 20-Mar-24

Depth: 21.00-21.90 m

Load: **109 kPa**

Time  $1/2$  vs Deformation





**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 218.5 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0                             | 0                | 0                  | 0                | 0                        |
| 0.1        | 6              | 2.44949                       | 0.102            | 0.3162278          | 0.102            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.124            | 0.5000000          | 0.124            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.147            | 0.7071068          | 0.147            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.178            | 1.0000000          | 0.178            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.226            | 1.4142136          | 0.226            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.269            | 2.0000000          | 0.269            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.353            | 2.8284271          | 0.353            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.427            | 3.8729833          | 0.427            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.528            | 5.4772256          | 0.528            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.627            | 7.7459667          | 0.627            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.711            | 10.9544512         | 0.711            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.775            | 15.4919334         | 0.775            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.838            | 21.9089023         | 0.838            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.879            | 37.9473319         | 0.879            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

PROJECT:

CAVAROSA

Job No.: 2-1259

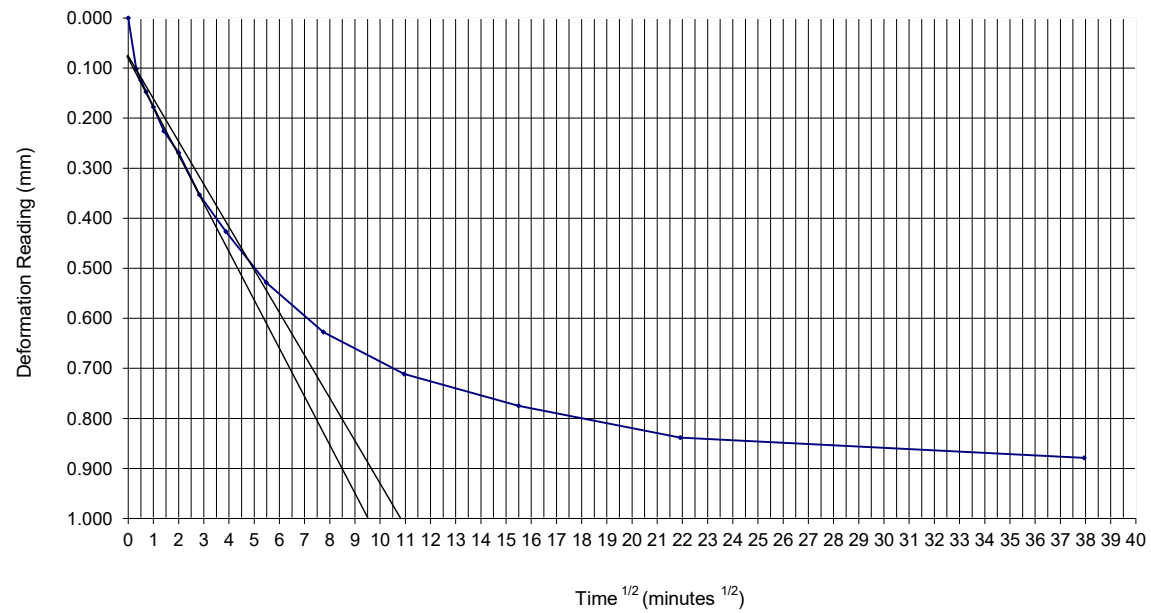
Date: 20-Mar-24

Borehole: H3

Depth: 21.00-21.90 m

Load: **219 kPa**

Time  $1/2$  vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H3  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 21.00-21.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 437.1 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0                             | 0                | 0                  | 0                | 0                        |
| 0.1        | 6              | 2.44949                       | 0.132            | 0.31623            | 0.132            | 0.363662                 |
| 0.25       | 15             | 3.87298                       | 0.155            | 0.50000            | 0.155            | 0.575000                 |
| 0.5        | 30             | 5.47723                       | 0.188            | 0.70711            | 0.188            | 0.813173                 |
| 1          | 60             | 7.74597                       | 0.226            | 1.00000            | 0.226            | 1.150000                 |
| 2          | 120            | 10.95445                      | 0.282            | 1.41421            | 0.282            | 1.626346                 |
| 4          | 240            | 15.49193                      | 0.356            | 2.00000            | 0.356            | 2.300000                 |
| 8          | 480            | 21.90890                      | 0.465            | 2.82843            | 0.465            | 3.252691                 |
| 15         | 900            | 30.00000                      | 0.559            | 3.87298            | 0.559            | 4.453931                 |
| 30         | 1800           | 42.42641                      | 0.696            | 5.47723            | 0.696            | 6.298809                 |
| 60         | 3600           | 60.00000                      | 0.813            | 7.74597            | 0.813            | 8.907862                 |
| 120        | 7200           | 84.85281                      | 0.930            | 10.95445           | 0.930            | 12.597619                |
| 240        | 14400          | 120.00000                     | 0.988            | 15.49193           | 0.988            | 17.815723                |
| 480        | 28800          | 169.70563                     | 1.041            | 21.90890           | 1.041            | 25.195238                |
| 1440       | 86400          | 293.93877                     | 1.118            | 37.94733           | 1.118            | 43.639432                |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 2  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

PROYECT:

CAVAROSA

Job No.: 2-1259

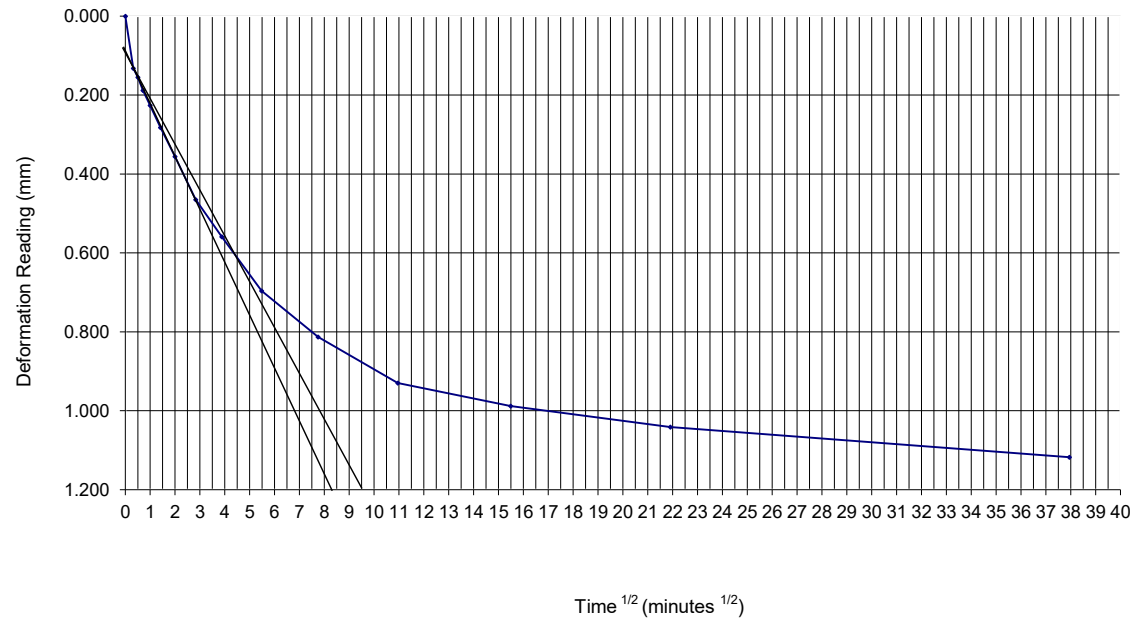
Date: 20-Mar-24

Borehole: H3

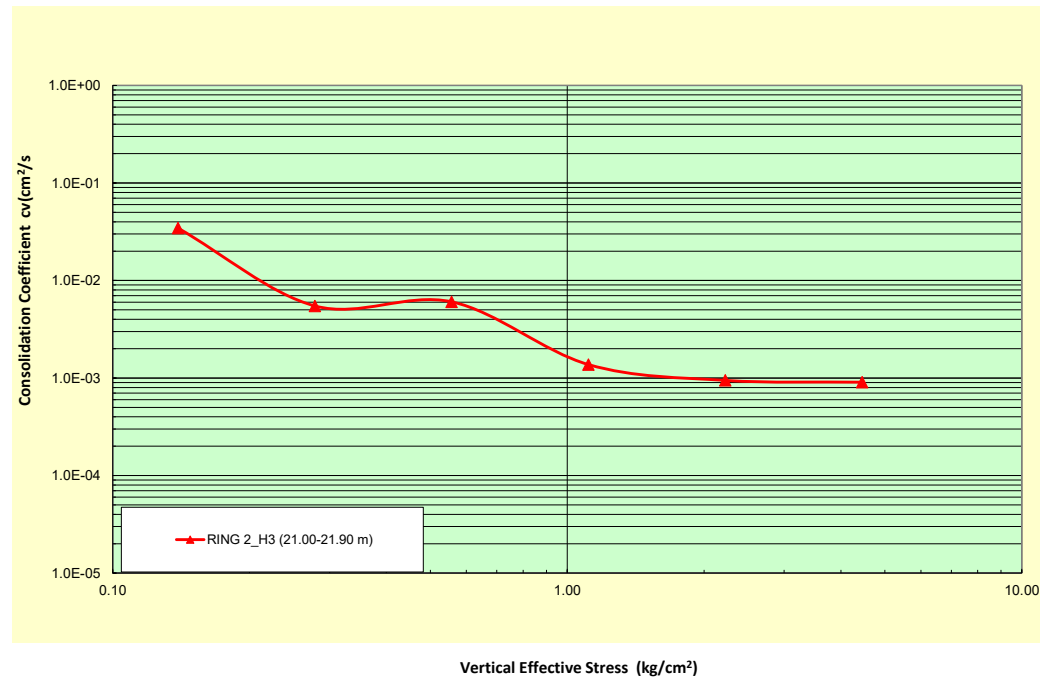
Depth: 21.00-21.90 m

Load: **437 kPa**

Time  $1/2$  vs Deformation



CONSOLIDATION COEFFICIENT VS VERTICAL EFFECTIVE STRESS



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST  
 ASTM D 2435**

**F-091**

Fecha Efectiva:  
15 de Abril de 2011

Area:  
Pruebas y Ensayos

Versión:  
0

Página:  
1 de 1

TRABAJO No./JOB No.  
 CLIENTE/CLIENT:  
 PROYECTO/ PROJECT:

2-1259  
 SFERA PROPERTIES CORP  
 CAVAROSA

SONDEO/ BEROHOLE.:  
 MUESTRA/SAMPLE:  
 PROFUNDIDAD/ DEPTH:  
 FECHA/ DATE:  
 TECNICO/ TECHNICIAN:

H5  
 1  
 18.00-18.90 m  
 20-Mar-24  
 C. CORDOBA

LOCALIZACION/ LOCATION:  
 METODO/METHOD:

CALZADA DE AMADOR, CIUDAD DE PANAMA  
 A

| DATOS INICIALES/ INITIAL DATA:                                          |       |
|-------------------------------------------------------------------------|-------|
| Altura inicial del suelo/ Initial height of soil, Hi (cm)               | 2.54  |
| Diámetro del suelo/ Diameter of soil, d (cm)                            | 6.35  |
| Gravedad Específica del suelo/ Specific Gravity, Gs                     | 2.65  |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )                      | 31.67 |
| Volumen inicial del suelo/ Initial volume of soil, V (cm <sup>3</sup> ) | 80.44 |

**DATOS DE MUESTRA/SAMPLE DATA**

ESTRUCTURA/STRUCTURE:  
 DESCRIPCION/DESCRIPTION:

HOMOGÉNEA

| Contenido de humedad inicial de las taras/ Water Content from tares |       |       |
|---------------------------------------------------------------------|-------|-------|
| Tara No./ Tare No.                                                  | 712   | 712   |
| Tara + suelo húmedo/ Tare + Wet Soil, g                             | 175.3 | 175.3 |
| Peso de tara/ Tare mass, g                                          | 30.0  | 30    |
| Tara + suelo seco/ Tare + dry soil, g                               | 132.4 | 132.4 |
| Contenido de humedad/ Water Content, w (%)                          | 41.89 | 41.89 |
| Contenido de humedad promedio/ Average water content (%)            | 41.89 |       |

| HUMEDAD INICIAL/ INITIAL WATER CONTENT                             |        |
|--------------------------------------------------------------------|--------|
| Peso del anillo + probeta húmeda/ Ring + wet soil (g)              | 322.90 |
| Peso del anillo/ Ring mass (g)                                     | 193.90 |
| Peso del suelo húmedo/ Wet soil mass (g)                           | 129.00 |
| Peso del suelo seco/ Dry Soil mass, Ws (g)                         | 88.40  |
| Contenido de humedad inicial/ Initial water content of soil, ω (%) | 45.93  |
| Grado de saturación inicial/ Initial degree of saturation, Si (%)  | 86.23  |

| HUMEDAD FINAL/ FINAL WATER CONTENT                              |        |
|-----------------------------------------------------------------|--------|
| Vidrio + Anillo + Probeta húmeda final/ Glass+Ring+wet soil (g) | 400.10 |
| Vidrio + Anillo + Probeta seca final/ Glass+ring+ dry soil (g)  | 359.70 |
| Peso del agua final/ Water mass, Wwf (g)                        | 40.40  |
| Volumen de agua final/ Volume of water Vwf (cm <sup>3</sup> )   | 40.40  |
| Peso del vidrio/ Glass mass, (g)                                | 77.40  |
| Peso del suelo seco/ Dry Soil mass, Ws (g)                      | 88.40  |
| Contenido de humedad final/ Final water content of soil, ωf (%) | 45.70  |

Deformación total de la muestra/ Total displacement of soil, ΔH (cm): 0.237744

| RESULTADOS/ RESULT                                                      |        |
|-------------------------------------------------------------------------|--------|
| Altura de sólidos calculada/ Calculated height of solids, Hs (cm)       | 1.053  |
| Altura inicial de vacíos/ Initial height of voids, Hvi (cm)             | 1.487  |
| Relación de vacíos inicial/ Initial Void Ratio, ei                      | 1.411  |
| Altura final de vacíos/ Final height of voids, Hvf (cm)                 | 1.249  |
| Relación de vacíos final/ Final Void ratio, ef                          | 1.186  |
| Grado de saturación final/ Final degree of saturation (assumed), Sf (%) | 100.00 |
| Contenido de humedad final/ Final water content, ωf (%)                 | 45.70  |

| EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST |          |              |     |                  |       |              |    |
|---------------------------------------------------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment                                              | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment                                              | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L.NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMA  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

| Load or the Weights<br>(kg) | Applied Load<br>(kg) | Applied Stress<br>(kg/cm2) | Applied Stress<br>(kPa) | Deformation at the end of each increment<br>(mm) | Accumulate Deformation<br>(mm) | Accumulate Deformation<br>$\Delta H$ (yμ) | Strain Deformation<br>$\epsilon = \Delta H/H_0 \times 100$ | $\Delta \epsilon = \Delta H/H_0$ | and instantaneous | Compressibility Coefficient<br>$av$ (m2/MN) | Volumetric Compressibility Coefficient<br>$mv$ (m2/MN) | $\Delta H_{50}$<br>(mm) | $H_{50}$<br>(cm) | $H_{d50}$<br>(cm) | $(t90)^{0.5}$<br>(min <sup>0.5</sup> ) | t90<br>(min) | Consolidation Coefficient<br>$cv$ (cm2/seg) |
|-----------------------------|----------------------|----------------------------|-------------------------|--------------------------------------------------|--------------------------------|-------------------------------------------|------------------------------------------------------------|----------------------------------|-------------------|---------------------------------------------|--------------------------------------------------------|-------------------------|------------------|-------------------|----------------------------------------|--------------|---------------------------------------------|
| 0.00                        | 0.00                 | 0.00                       | 0.00                    | 0.000                                            | 0.00                           | 0.00                                      | 0.00                                                       | 0.00                             | 1.41              | 0.00                                        | 0.00                                                   | 0.00                    | 2.54             | 1.27              | --                                     | --           |                                             |
| 0.50                        | 4.58                 | 0.14                       | 14.17                   | 0.127                                            | 0.13                           | 0.01                                      | 0.50                                                       | 0.01                             | 1.40              | 0.85                                        | 0.35                                                   | 0.06                    | 2.53             | 1.27              | 1.07                                   | 1.15         | 1.97E-02                                    |
| 1.00                        | 9.15                 | 0.29                       | 28.34                   | 0.145                                            | 0.27                           | 0.03                                      | 1.07                                                       | 0.03                             | 1.39              | 0.97                                        | 0.40                                                   | 0.05                    | 2.52             | 1.26              | 1.20                                   | 1.44         | 1.56E-02                                    |
| 2.00                        | 18.30                | 0.58                       | 56.68                   | 0.356                                            | 0.63                           | 0.06                                      | 2.47                                                       | 0.06                             | 1.35              | 1.19                                        | 0.49                                                   | 0.12                    | 2.50             | 1.25              | 0.95                                   | 0.90         | 2.46E-02                                    |
| 4.00                        | 36.60                | 1.16                       | 113.35                  | 0.460                                            | 1.09                           | 0.11                                      | 4.28                                                       | 0.10                             | 1.31              | 0.77                                        | 0.32                                                   | 0.17                    | 2.46             | 1.23              | 1.13                                   | 1.28         | 1.67E-02                                    |
| 8.00                        | 73.20                | 2.31                       | 226.71                  | 0.681                                            | 1.77                           | 0.18                                      | 6.96                                                       | 0.17                             | 1.24              | 0.57                                        | 0.24                                                   | 0.24                    | 2.41             | 1.20              | 1.07                                   | 1.14         | 1.80E-02                                    |
| 16.00                       | 146.40               | 4.62                       | 453.41                  | 1.011                                            | 2.78                           | 0.28                                      | 10.94                                                      | 0.26                             | 1.15              | 0.42                                        | 0.18                                                   | 0.36                    | 2.33             | 1.16              | 1.02                                   | 1.05         | 1.83E-02                                    |
| 8.00                        | 73.20                | 2.31                       | 226.71                  | -0.051                                           | 2.73                           | 0.27                                      | 10.74                                                      | 0.26                             | 1.15              | 0.02                                        | 0.01                                                   |                         |                  |                   |                                        |              |                                             |
| 4.00                        | 36.60                | 1.16                       | 113.35                  | -0.079                                           | 2.65                           | 0.26                                      | 10.43                                                      | 0.25                             | 1.16              | 0.07                                        | 0.03                                                   |                         |                  |                   |                                        |              |                                             |
| 2.00                        | 18.30                | 0.58                       | 56.68                   | -0.079                                           | 2.57                           | 0.26                                      | 10.12                                                      | 0.24                             | 1.17              | 0.13                                        | 0.05                                                   |                         |                  |                   |                                        |              |                                             |
| 1.00                        | 9.15                 | 0.29                       | 28.34                   | -0.081                                           | 2.49                           | 0.25                                      | 9.80                                                       | 0.24                             | 1.18              | 0.27                                        | 0.11                                                   |                         |                  |                   |                                        |              |                                             |
| 0.50                        | 4.58                 | 0.14                       | 14.17                   | -0.061                                           | 2.43                           | 0.24                                      | 9.56                                                       | 0.23                             | 1.18              | 0.41                                        | 0.17                                                   |                         |                  |                   |                                        |              |                                             |
| 0.00                        | 0.00                 | 0.00                       | 0.00                    | -0.051                                           | 2.38                           | 0.24                                      | 9.36                                                       | 0.23                             | 1.19              | 0.34                                        | 0.14                                                   |                         |                  |                   |                                        |              |                                             |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L.NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
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1973

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

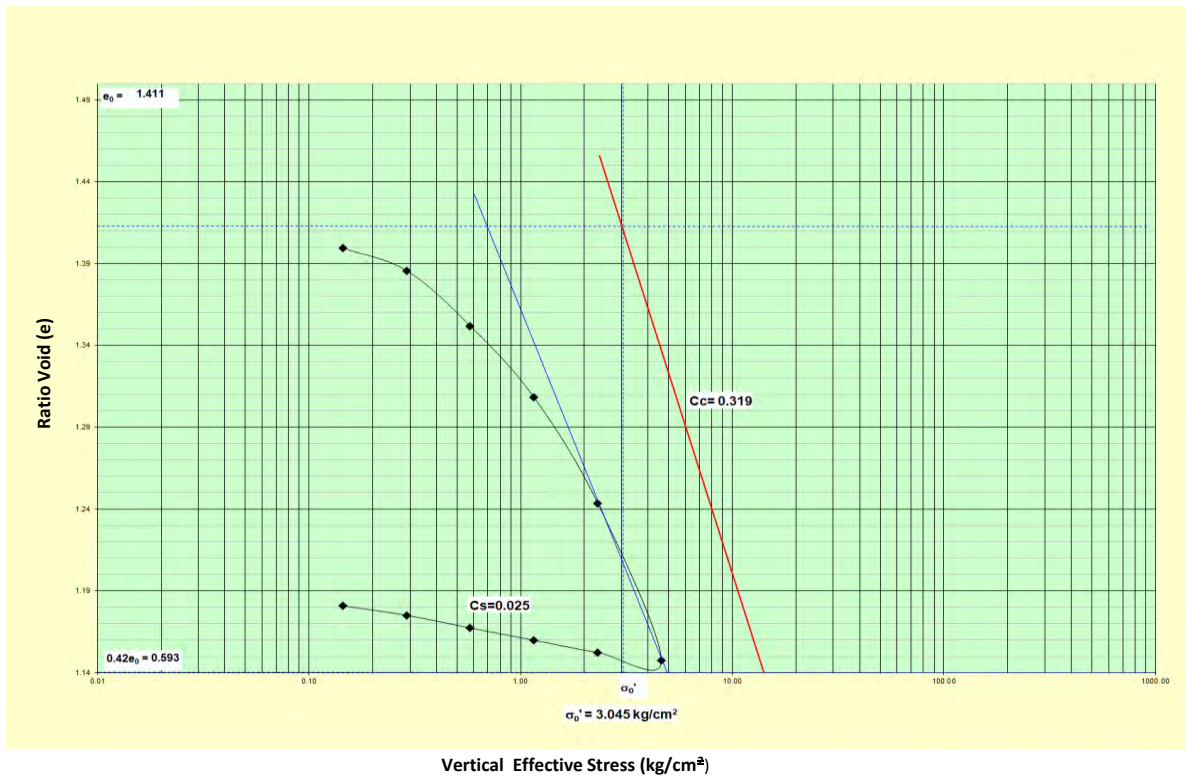
Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMA  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**CONSOLIDATION CURVE**

Ring : 1      Borehole: H5      Depth: 18.00-18.90 m



| EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST |          |              |     |                  |       |
|---------------------------------------------------------------|----------|--------------|-----|------------------|-------|
| Equipo/Equipment                                              | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  |
| Equipo/Equipment                                              | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS |
|                                                               |          |              |     | Serie/Serial     | 1     |
|                                                               |          |              |     | Serie/Serial     | 36    |

OBSERVACIONES / REMARKS: EL MATERIAL SE ENCUENTRA NORMALMENTE CONSOLIDADO.

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

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**15 de Abril de 2011**

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**Pruebas y Ensayos**

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Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 14.2 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.000000           | 0                | 0.00000                  |
| 0.1        | 6              | 2.44949                       | 0.097            | 0.316228           | 0.097            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.099            | 0.500000           | 0.099            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.102            | 0.707107           | 0.102            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.104            | 1.000000           | 0.104            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.107            | 1.414214           | 0.107            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.109            | 2.000000           | 0.109            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.112            | 2.828427           | 0.112            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.114            | 3.872983           | 0.114            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.117            | 5.477226           | 0.117            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.119            | 7.745967           | 0.119            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.122            | 10.954451          | 0.122            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.124            | 15.491933          | 0.124            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.127            | 21.908902          | 0.127            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.127            | 37.947332          | 0.127            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

PROJECT: CAVAROSA

Job No.: 2-1259

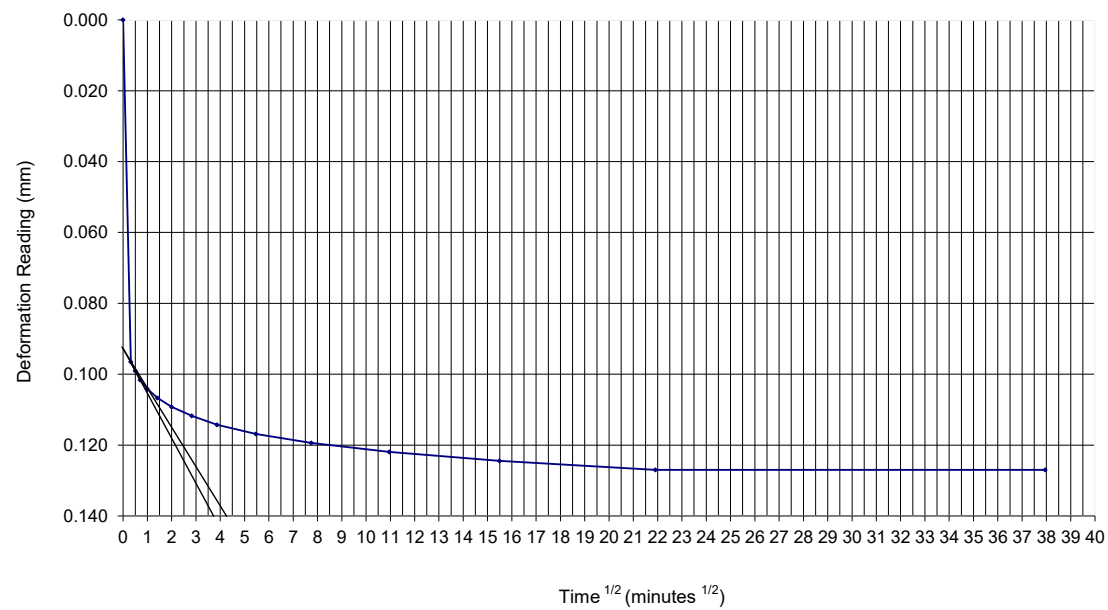
Borehole: H5

Date: 20-Mar-24

Depth: 18.00-18.90 m

Load: 14 kPa

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST  
ASTM D 2435**

**F-091**

Fecha Efectiva:  
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Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 28.3 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.00000            | 0                | 0.00000                  |
| 0.1        | 6              | 2.44949                       | 0.071            | 0.31623            | 0.071            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.076            | 0.50000            | 0.076            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.081            | 0.70711            | 0.081            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.089            | 1.00000            | 0.089            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.091            | 1.41421            | 0.091            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.094            | 2.00000            | 0.094            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.099            | 2.82843            | 0.099            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.104            | 3.87298            | 0.104            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.112            | 5.47723            | 0.112            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.117            | 7.74597            | 0.117            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.122            | 10.95445           | 0.122            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.127            | 15.49193           | 0.127            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.135            | 21.90890           | 0.135            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.145            | 37.94733           | 0.145            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
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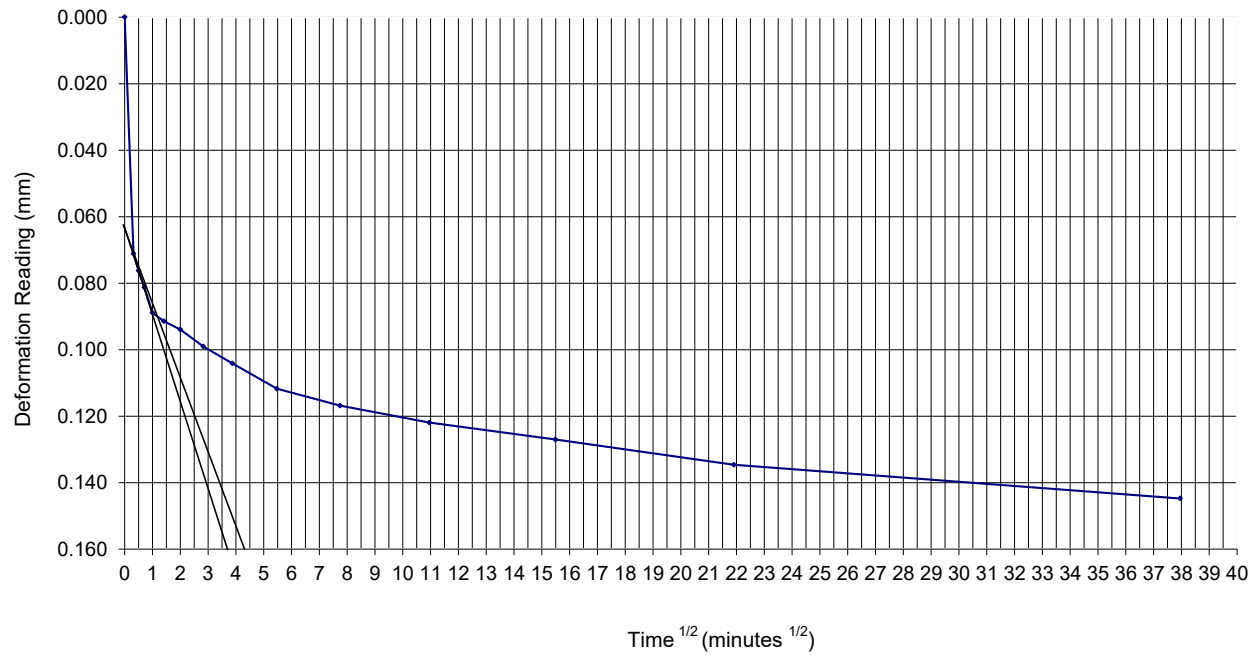
PROJECT: CAVAROSA

Job No.: 2-1259  
Borehole: H5

Date: 20-Mar-24  
Depth: 18.00-18.90 m

Load: **28 kPa**

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
15 de Abril de 2011

Area:  
Pruebas y Ensayos

Versión:  
0

Página:  
1 de 1

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 56.7 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.0000                        | 0                | 0.00000            | 0                | 0.00000                  |
| 0.1        | 6              | 2.4495                        | 0.191            | 0.31623            | 0.191            | 0.36366                  |
| 0.25       | 15             | 3.8730                        | 0.201            | 0.50000            | 0.201            | 0.57500                  |
| 0.5        | 30             | 5.4772                        | 0.211            | 0.70711            | 0.211            | 0.81317                  |
| 1          | 60             | 7.7460                        | 0.218            | 1.00000            | 0.218            | 1.15000                  |
| 2          | 120            | 10.9545                       | 0.229            | 1.41421            | 0.229            | 1.62635                  |
| 4          | 240            | 15.4919                       | 0.241            | 2.00000            | 0.241            | 2.30000                  |
| 8          | 480            | 21.9089                       | 0.249            | 2.82843            | 0.249            | 3.25269                  |
| 15         | 900            | 30.0000                       | 0.259            | 3.87298            | 0.259            | 4.45393                  |
| 30         | 1800           | 42.4264                       | 0.269            | 5.47723            | 0.269            | 6.29881                  |
| 60         | 3600           | 60.0000                       | 0.277            | 7.74597            | 0.277            | 8.90786                  |
| 120        | 7200           | 84.8528                       | 0.295            | 10.95445           | 0.295            | 12.59762                 |
| 240        | 14400          | 120.0000                      | 0.305            | 15.49193           | 0.305            | 17.81572                 |
| 480        | 28800          | 169.7056                      | 0.315            | 21.90890           | 0.315            | 25.19524                 |
| 2880       | 172800         | 415.6922                      | 0.356            | 53.66563           | 0.356            | 61.71548                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L.NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

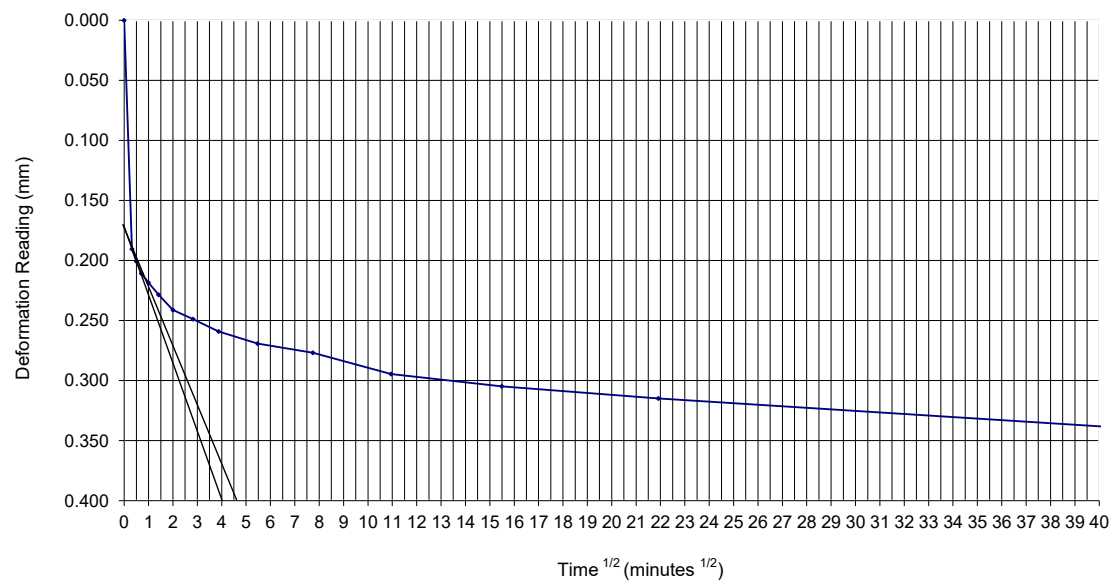
PROJECT: CAVAROSA

Job No.: 2-1259  
Borehole: H5

Date: 20-Mar-24  
Depth: 18.00-18.90 m

Load: **57 kPa**

Time 1/2 vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
 CLIENTE/CLIENT: SFERA PROPERTIES CORP  
 PROYECTO/ PROJECT CAVAROSA  
 LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
 METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
 MUESTRA/SAMPLE: 1  
 PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
 FECHA/ DATE: 20-Mar-24  
 TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 113.4 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0.00000                       | 0                | 0.00000            | 0                | 0.000000                 |
| 0.1        | 6              | 2.44949                       | 0.246            | 0.31623            | 0.246            | 0.363662                 |
| 0.25       | 15             | 3.87298                       | 0.262            | 0.50000            | 0.262            | 0.575000                 |
| 0.5        | 30             | 5.47723                       | 0.277            | 0.70711            | 0.277            | 0.813173                 |
| 1          | 60             | 7.74597                       | 0.295            | 1.00000            | 0.295            | 1.150000                 |
| 2          | 120            | 10.95445                      | 0.307            | 1.41421            | 0.307            | 1.626346                 |
| 4          | 240            | 15.49193                      | 0.320            | 2.00000            | 0.320            | 2.300000                 |
| 8          | 480            | 21.90890                      | 0.335            | 2.82843            | 0.335            | 3.252691                 |
| 15         | 900            | 30.00000                      | 0.351            | 3.87298            | 0.351            | 4.453931                 |
| 30         | 1800           | 42.42641                      | 0.366            | 5.47723            | 0.366            | 6.298809                 |
| 60         | 3600           | 60.00000                      | 0.381            | 7.74597            | 0.381            | 8.907862                 |
| 120        | 7200           | 84.85281                      | 0.396            | 10.95445           | 0.396            | 12.597619                |
| 240        | 14400          | 120.00000                     | 0.409            | 15.49193           | 0.409            | 17.815723                |
| 480        | 28800          | 169.70563                     | 0.432            | 21.90890           | 0.432            | 25.195238                |
| 1440       | 86400          | 293.93877                     | 0.460            | 37.94733           | 0.460            | 43.639432                |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO

PROJECT: CAVAROSA

Job No.: 2-1259

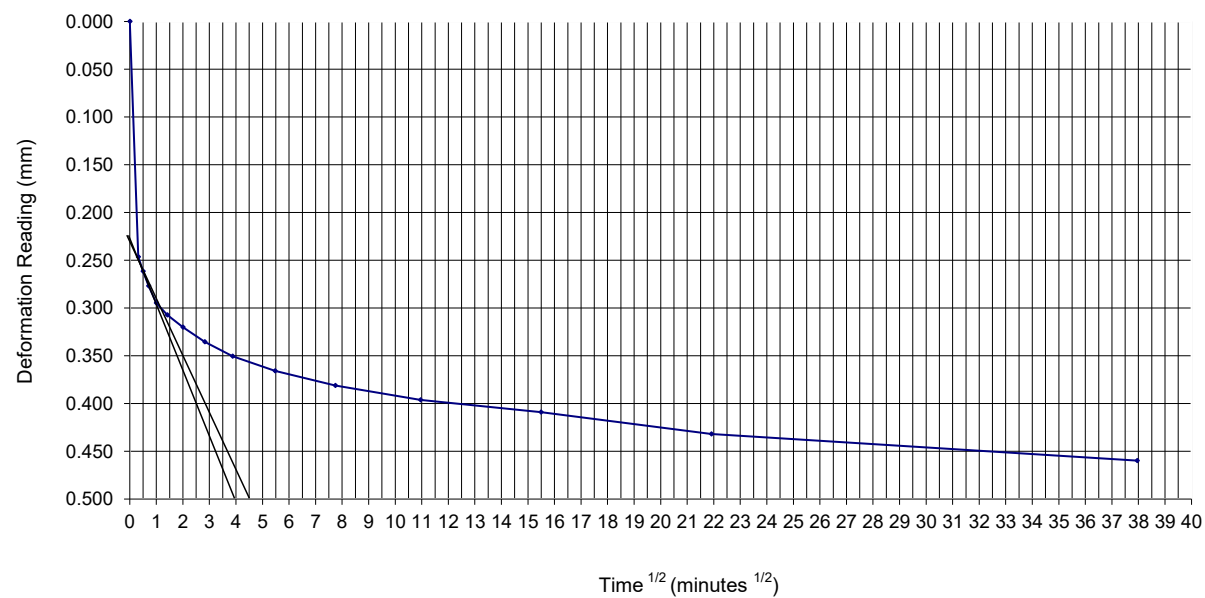
Date: 20-Mar-24

Borehole: H5

Depth: 18.00-18.90 m

Load: **113 kPa**

Time  $1/2$  vs Deformation





**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT: CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 226.7 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0                             | 0                | 0                  | 0                | 0                        |
| 0.1        | 6              | 2.44949                       | 0.353            | 0.3162278          | 0.353            | 0.36366                  |
| 0.25       | 15             | 3.87298                       | 0.378            | 0.5000000          | 0.378            | 0.57500                  |
| 0.5        | 30             | 5.47723                       | 0.399            | 0.7071068          | 0.399            | 0.81317                  |
| 1          | 60             | 7.74597                       | 0.422            | 1.0000000          | 0.422            | 1.15000                  |
| 2          | 120            | 10.95445                      | 0.447            | 1.4142136          | 0.447            | 1.62635                  |
| 4          | 240            | 15.49193                      | 0.467            | 2.0000000          | 0.467            | 2.30000                  |
| 8          | 480            | 21.90890                      | 0.490            | 2.8284271          | 0.490            | 3.25269                  |
| 15         | 900            | 30.00000                      | 0.511            | 3.8729833          | 0.511            | 4.45393                  |
| 30         | 1800           | 42.42641                      | 0.533            | 5.4772256          | 0.533            | 6.29881                  |
| 60         | 3600           | 60.00000                      | 0.556            | 7.7459667          | 0.556            | 8.90786                  |
| 120        | 7200           | 84.85281                      | 0.579            | 10.9544512         | 0.579            | 12.59762                 |
| 240        | 14400          | 120.00000                     | 0.612            | 15.4919334         | 0.612            | 17.81572                 |
| 480        | 28800          | 169.70563                     | 0.640            | 21.9089023         | 0.640            | 25.19524                 |
| 1440       | 86400          | 293.93877                     | 0.681            | 37.9473319         | 0.681            | 43.63943                 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

PROJECT:

CAVAROSA

Job No.: 2-1259

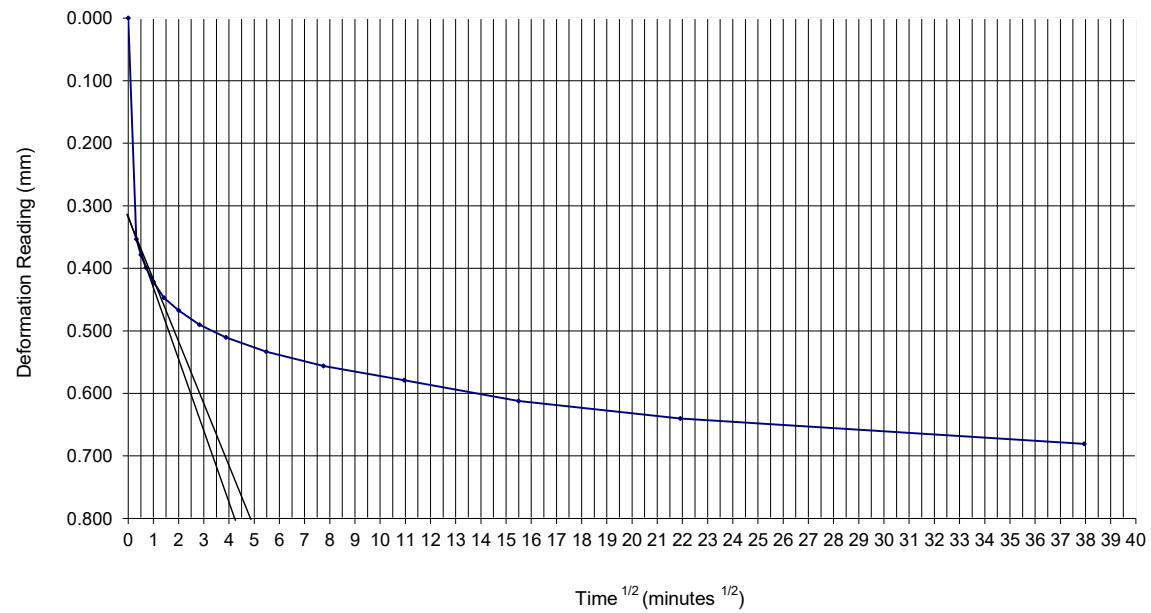
Date: 20-Mar-24

Borehole: H5

Depth: 18.00-18.90 m

Load: **227 kPa**

Time  $1/2$  vs Deformation



**ENSAYO DE CONSOLIDACIÓN/ CONSOLIDATION TEST**  
**ASTM D 2435**

**F-091**

Fecha Efectiva:  
**15 de Abril de 2011**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 1**

TRABAJO No./JOB No. 2-1259  
CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/ PROJECT CAVAROSA  
LOCALIZACION/ LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
METODO/METHOD: A

SONDEO/ BEROHOLE.: H5  
MUESTRA/SAMPLE: 1  
PROFUNDIDAD/ DEPTH: 18.00-18.90 m  
FECHA/ DATE: 20-Mar-24  
TECNICO/ TECHNICIAN: C. CORDOBA

**DATA LOADING FOR 453.4 kPa**

| Time (min) | Time (Seconds) | Time <sup>1/2</sup> (Seconds) | Deformation (mm) | Time 1/2 (Seconds) | Deformation (mm) | 1.15 Time <sup>1/2</sup> |
|------------|----------------|-------------------------------|------------------|--------------------|------------------|--------------------------|
| 0          | 0              | 0                             | 0                | 0                  | 0                | 0                        |
| 0.1        | 6              | 2.44949                       | 0.526            | 0.31623            | 0.526            | 0.363662                 |
| 0.25       | 15             | 3.87298                       | 0.569            | 0.50000            | 0.569            | 0.575000                 |
| 0.5        | 30             | 5.47723                       | 0.602            | 0.70711            | 0.602            | 0.813173                 |
| 1          | 60             | 7.74597                       | 0.638            | 1.00000            | 0.638            | 1.150000                 |
| 2          | 120            | 10.95445                      | 0.678            | 1.41421            | 0.678            | 1.626346                 |
| 4          | 240            | 15.49193                      | 0.714            | 2.00000            | 0.714            | 2.300000                 |
| 8          | 480            | 21.90890                      | 0.752            | 2.82843            | 0.752            | 3.252691                 |
| 15         | 900            | 30.00000                      | 0.780            | 3.87298            | 0.780            | 4.453931                 |
| 30         | 1800           | 42.42641                      | 0.815            | 5.47723            | 0.815            | 6.298809                 |
| 60         | 3600           | 60.00000                      | 0.848            | 7.74597            | 0.848            | 8.907862                 |
| 120        | 7200           | 84.85281                      | 0.884            | 10.95445           | 0.884            | 12.597619                |
| 240        | 14400          | 120.00000                     | 0.909            | 15.49193           | 0.909            | 17.815723                |
| 480        | 28800          | 169.70563                     | 0.947            | 21.90890           | 0.947            | 25.195238                |
| 1440       | 86400          | 293.93877                     | 1.011            | 37.94733           | 1.011            | 43.639432                |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 260 | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 36 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

PROYECT:

CAVAROSA

Job No.: 2-1259

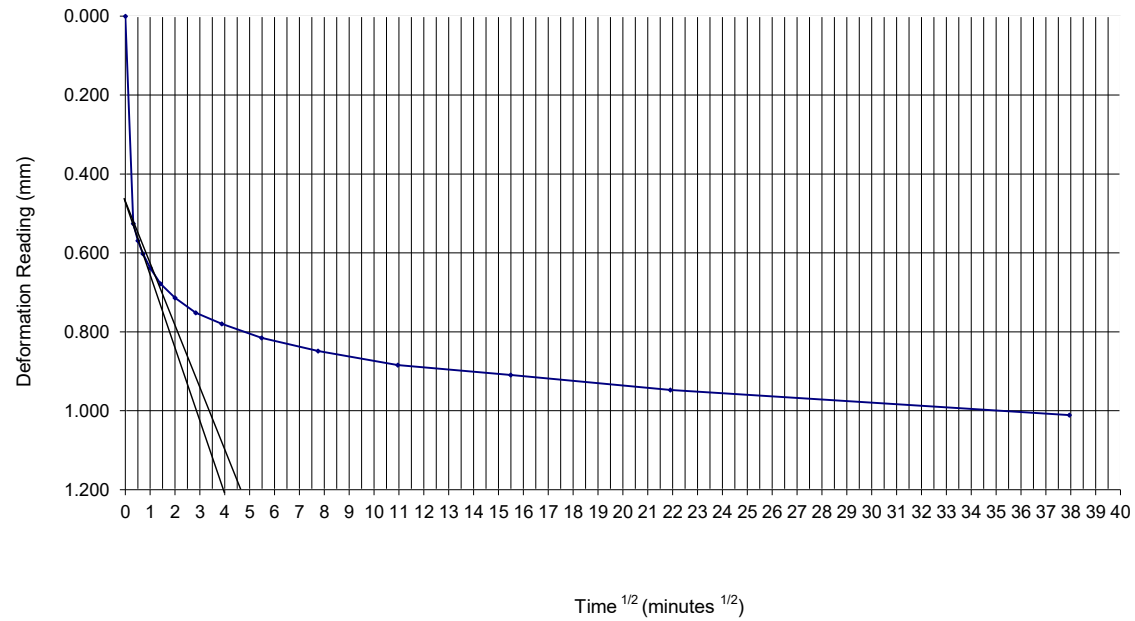
Date: 20-Mar-24

Borehole: H5

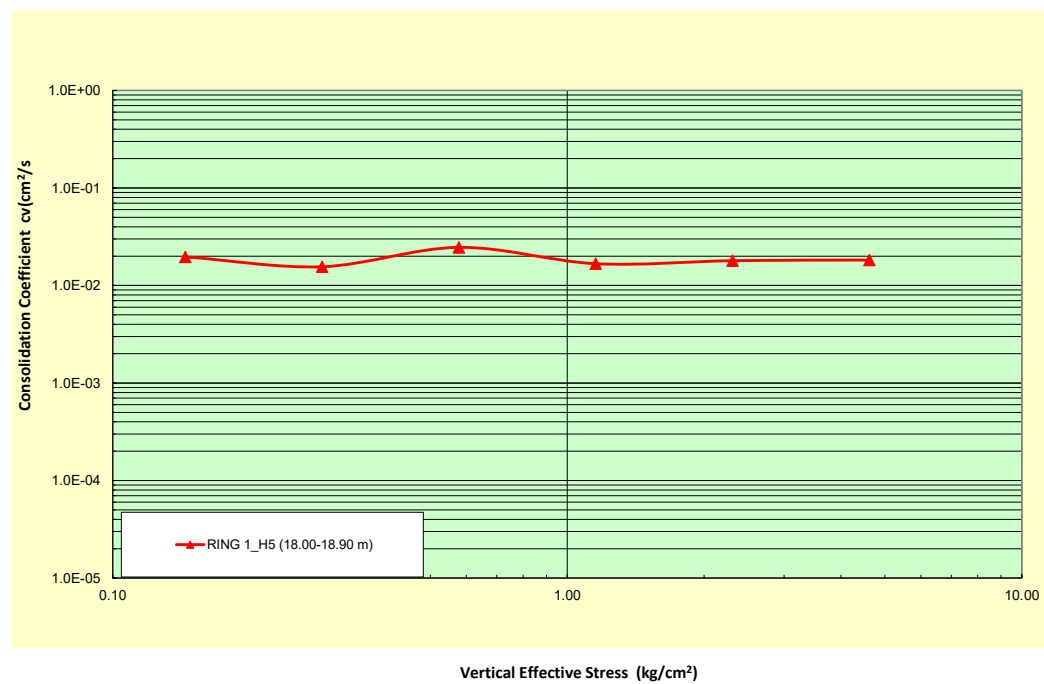
Depth: 18.00-18.90 m

Load: **453 kPa**

Time  $1/2$  vs Deformation



CONSOLIDATION COEFFICIENT VS VERTICAL EFFECTIVE STRESS





**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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1973

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD TEST  
METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE SOILS D 4546-  
08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Área:  
**Pruebas y Ensayos**

Versión:  
**0**

Página: 1 de 14

|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

Presión aplicada a la probeta:

**2.662 kPa**

| DATOS INICIALES/INITIAL DATA:                                  |        |
|----------------------------------------------------------------|--------|
| Probeta 1                                                      |        |
| Altura inicial del suelo/ Initial height of soil, Hi (mm)      | 20.00  |
| Diámetro del suelo/ Diameter of soil, d (mm)                   | 63.50  |
| Peso del suelo/ Specimen weighth, W (g)                        | 112.2  |
| Gravedad Específica del suelo/ Specific Gravity, Gs            | 2.65   |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )             | 31.67  |
| Volumen inicial del suelo/ Initial volume of soil, V1 (cm3)    | 63.34  |
| Humedad inicial/ Initial Water content, W1 (%)                 | 43.90  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_1$ (g/cm3) | 1.77   |
| Densidad seca/ Dry Unit weighth, $\gamma_{d1}$ (g/cm3)         | 1.23   |
| Grado de saturación/ Degree of saturation, S1 (%)              | 100.00 |

| Contenido de humedad inicial de las taras/ Water Content from tares |       |
|---------------------------------------------------------------------|-------|
| Tara No./ Tare No.                                                  | LM    |
| Tara + suelo húmedo/ Tare + Wet Soil, g                             | 99.3  |
| Peso de tara/ Tare mass, g                                          | 26.2  |
| Tara + suelo seco/ Tare + dry soil, g                               | 77    |
| Contenido de humedad/ Water Content, w (%)                          | 43.90 |

| DATOS FINALES/FINAL DATA:                                      |       |
|----------------------------------------------------------------|-------|
| Probeta 1                                                      |       |
| Altura final del suelo/ Final height of soil, H2 (mm)          | 20.06 |
| Peso del suelo/ Specimen weighth, W (g)                        | 79.7  |
| Volumen final del suelo/ Final volume of soil, V2 (cm3)        | 63.5  |
| Peso seco del suelo/ Dry weighth Wd (g)                        | 43.2  |
| Humedad final/ Final Water content, W2 (%)                     | 84.49 |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_2$ (g/cm3) | 1.25  |
| Densidad seca/ Dry Unit weighth, $\gamma_{d2}$ (g/cm3)         | 0.68  |
| Grado de saturación/ Degree of saturation, S2 (%)              | 77.30 |

| EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST |          |              |     |                  |       |              |    |
|---------------------------------------------------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment                                              | ODOMETER | Serie/Serial | 1   | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment                                              | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | O2 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD  
TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**2 de 14**

TRABAJO No./JOB No. **2-1259**  
CLIENTE/CLIENT: **SFERA PROPERTIES CORP**  
PROYECTO/ PROJECT: **CAVAROSA**  
LOCALIZACION/ LOCATION: **CALZADA DE AMADOR, CIUDAD DE PANAMÁ**  
METODO/METHOD: **"A"**

SONDEO/ BEROHOLE.: **3**  
MUESTRA/SAMPLE: **M-1**  
PROFUNDIDAD/ DEPTH: **21.00 m - 21.90 m**  
FECHA/ DATE: **08-Mar-24**  
TECNICO/ TECHNICIAN: **C.CORDOBA**

**Presión vertical aplicada/ Vertical stress: 2.662 kpa**

|                                                                                                                                                                                  |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)                                                                                                                        | 20.000 |
| Compresión del espécimen después de la aplicación de la carga y antes del inundamiento/ specimen compression after stress application and immediately prior to wetting, Ah1 (mm) | 0.117  |
| Altura espécimen antes de inundar, Specimen height immediately prior to wetting h1 (mm)                                                                                          | 19.883 |
| Variación de la altura del espécimen: hinchamiento o colapso tras inundación/ Change in specimen weight: swell or collapse after wetting Ah2 (mm)                                | 0.175  |
| Altura final del ensayo/ Final specimen height (h2)                                                                                                                              | 20.058 |
| Hinchamiento o colapso/ Swell or collapse strains, $\epsilon$ (%)                                                                                                                | 0.881  |

| t (min) | Lectura dial | Variación altura (mm) |
|---------|--------------|-----------------------|
| 0       | 647          | 0.000                 |
| 0.1     | 645          | 0.005                 |
| 0.25    | 644          | 0.008                 |
| 0.5     | 643          | 0.010                 |
| 1       | 639          | 0.020                 |
| 2       | 633          | 0.036                 |
| 4       | 628          | 0.048                 |
| 8       | 620          | 0.069                 |
| 15      | 610          | 0.094                 |
| 30      | 602          | 0.114                 |
| 60      | 598          | 0.124                 |
| 120     | 590          | 0.145                 |
| 240     | 585          | 0.157                 |
| 480     | 581          | 0.168                 |
| 1440    | 580          | 0.170                 |
| 2880    | 579          | 0.173                 |
| 4320    | 578          | 0.175                 |
| 5760    | 578          | 0.175                 |

**VARIACION TOTAL 69.00 0.175**

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 1   | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | O2 |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: **C.CORDOBA**  
Compilado por / Compiled by: **L. NAVARRO**

Revisado por/ Reviewed by: **L. NAVARRO**  
Presentado por / Presented by: **L. NAVARRO**

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD  
TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**3 de 14**

TRABAJO No./JOB No.  
CLIENTE/CLIENT:

2-1259  
SFERA PROPERTIES CORP

SONDEO/ BEROHOLE.:  
MUESTRA/SAMPLE:

3  
M-1

PROYECTO/ PROJECT:

CAVAROSA

PROFUNDIDAD/ DEPTH:

21.00 m - 21.90 m

LOCALIZACION/ LOCATION:

CALZADA DE AMADOR, CIUDAD DE PANAMÁ

FECHA/ DATE:

08-Mar-24

METODO/METHOD:

"A"

TECNICO/ TECHNICIAN:

C.CORDOBA

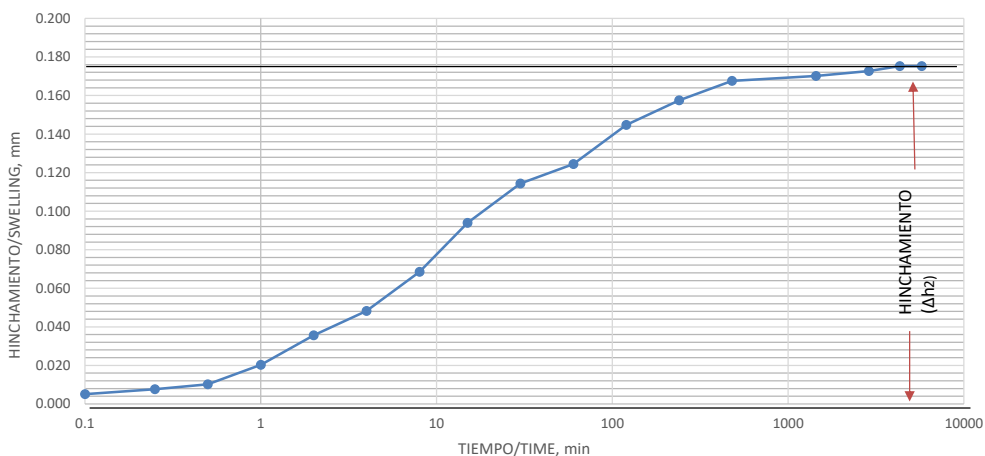
**DATOS FINALES/FINAL DATA:**

**Probeta 1**

Altura final del suelo/ Final height of soil, H<sub>2</sub> (cm)  
Humedad final/ Final Water content, w<sub>2</sub> (%)  
Densidad seca/ Dry Unit weight, γ<sub>d2</sub> (g/cm<sup>3</sup>)  
Grado de saturación/ Degree of saturation, S<sub>2</sub> (%)

20.06  
84.49  
0.68  
77.30

**CURVA TIEMPO-HINCHAMIENTO,/ TIME-SWELL CURVE**



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 1   | Equipo/Equipment | RING  | Serie/Serial | 1  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | 24 |

OBSERVACIONES / REMARKS:

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Ensayado por/ Tested by: C. CORDOBA

Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO

Presentado por / Presented by: L. NAVARRO



**TECNILAB, S. A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD  
TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Área:  
**Pruebas y Ensayos**

Versión:  
**0**

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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 3/8/2024          |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

Presión aplicada a la probeta:

**26.511 kPa**

**DATOS INICIALES/INITIAL DATA:**

**Probeta 2**

|                                                                |        |
|----------------------------------------------------------------|--------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)      | 20.00  |
| Diámetro del suelo/ Diameter of soil, d (mm)                   | 63.50  |
| Peso del suelo/ Specimen weighth, W (g)                        | 113.70 |
| Gravedad Específica del suelo/ Specific Gravity, Gs            | 2.65   |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )             | 31.67  |
| Volumen inicial del suelo/ Initial volume of soil, V1 (cm3)    | 63.34  |
| Humedad inicial/ Initial Water content, W1 (%)                 | 43.90  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_1$ (g/cm3) | 1.80   |
| Densidad seca/ Dry Unit weighth, $\gamma_{d1}$ (g/cm3)         | 1.25   |
| Grado de saturación/ Degree of saturation, S1 (%)              | 100.00 |

**Contenido de humedad inicial de las taras/ Water Content from tares**

|                                            |       |
|--------------------------------------------|-------|
| Tara No./ Tare No.                         | LM    |
| Tara + suelo húmedo/ Tare + Wet Soil, g    | 99.3  |
| Peso de tara/ Tare mass, g                 | 26.2  |
| Tara + suelo seco/ Tare + dry soil, g      | 77.0  |
| Contenido de humedad/ Water Content, w (%) | 43.90 |

**DATOS FINALES/FINAL DATA:**

**Probeta 2**

|                                                                |        |
|----------------------------------------------------------------|--------|
| Altura final del suelo/ Final height of soil, H2 (mm)          | 19.74  |
| Peso del suelo/ Specimen weighth, W (g)                        | 115.00 |
| Volumen final del suelo/ Final volume of soil, V2 (cm3)        | 62.50  |
| Peso seco del suelo/ Dry weighth Wd (g)                        | 79.40  |
| Humedad final/ Final Water content, W2 (%)                     | 44.84  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_2$ (g/cm3) | 1.84   |
| Densidad seca/ Dry Unit weighth, $\gamma_{d2}$ (g/cm3)         | 1.27   |
| Grado de saturación/ Degree of saturation, S2 (%)              | 100.00 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |     |
|------------------|----------|--------------|-----|------------------|-------|--------------|-----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 3   | Equipo/Equipment | RING  | Serie/Serial | 3   |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A15 |

OBSERVACIONES / REMARKS:

Ensayado por/Tested by: **C. CORDOBA**  
Compilado por / Compiled by: **L. NAVARRO**

Revisado por/Reviewed by: **L. NAVARRO**  
Presentado por / Presented by: **L. NAVARRO**

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD  
TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
24 de Marzo de 2014

Area:  
Pruebas y Ensayos

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TRABAJO No./JOB No.

2-1259

CLIENTE/CLIENT:

SFERA PROPERTIES CORP

PROYECTO/ PROJECT:

CAVAROSA

LOCALIZACION/ LOCATION:

CALZADA DE AMADOR, CIUDAD DE PANAMÁ

METODO/METHOD:

"A"

SONDEO/ BEROHOLE.:

3

MUESTRA/SAMPLE:

M-1

PROFUNDIDAD/ DEPTH:

21.00 m - 21.90 m

FECHA/ DATE:

08-Mar-24

TECNICO/ TECHNICIAN:

C.CORDOBA

|                                                    |               |            |
|----------------------------------------------------|---------------|------------|
| <b>Presión vertical aplicada/ Vertical stress:</b> | <b>26.511</b> | <b>kpa</b> |
|----------------------------------------------------|---------------|------------|

|                                                                                                                                                                                  |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)                                                                                                                        | 20.000 |
| Compresión del espécimen después de la aplicación de la carga y antes del inundamiento/ specimen compression after stress application and immediately prior to wetting, Ah1 (mm) | 0.302  |
| Altura espécimen antes de inundar, Specimen height immediately prior to wetting h1 (mm)                                                                                          | 19.698 |
| Variación de la altura del espécimen: hinchamiento o colapso tras inundación/ Change in specimen weight: swell or collapse after wetting Ah2 (mm)                                | 0.038  |
| Altura final del ensayo/ Final specimen height (h2)                                                                                                                              | 19.736 |
| Hinchamiento o colapso/ Swell or collapse strains, $\epsilon$ (%)                                                                                                                | 0.193  |

| t (min)                | Lectura dial | Variación altura (mm) |
|------------------------|--------------|-----------------------|
| 0                      | 727          | 0.000                 |
| 0.1                    | 727          | 0.000                 |
| 0.25                   | 726          | 0.003                 |
| 0.5                    | 725          | 0.005                 |
| 1                      | 722          | 0.013                 |
| 2                      | 721          | 0.015                 |
| 4                      | 717          | 0.025                 |
| 8                      | 714          | 0.033                 |
| 15                     | 712          | 0.038                 |
| 30                     | 712          | 0.038                 |
| 60                     | 712          | 0.038                 |
| 120                    | 712          | 0.038                 |
| 240                    | 712          | 0.038                 |
| 480                    | 712          | 0.038                 |
| 1440                   | 712          | 0.038                 |
| 2880                   | 712          | 0.038                 |
| 4320                   | 712          | 0.038                 |
| 5760                   | 712          | 0.038                 |
| <b>VARIACION TOTAL</b> | <b>15.00</b> | <b>0.038</b>          |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |     |
|------------------|----------|--------------|-----|------------------|-------|--------------|-----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 3   | Equipo/Equipment | RING  | Serie/Serial | 3   |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A15 |

OBSERVACIONES / REMARKS:

Ensayado por/Tested by: C.CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

Fecha Efectiva:  
24 de Marzo de 2014

Area:  
Pruebas y Ensayos

Versión:  
0

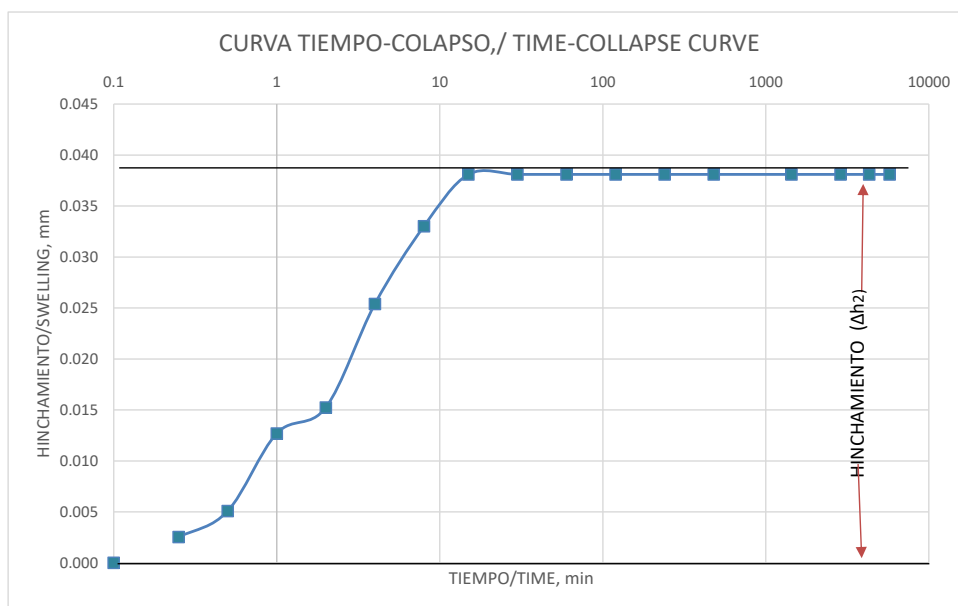
Página:  
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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

**DATOS FINALES/FINAL DATA:**

**Probeta 2**

|                                                                   |        |
|-------------------------------------------------------------------|--------|
| Altura final del suelo/ Final height of soil, H <sub>2</sub> (cm) | 19.74  |
| Humedad final/ Final Water content, W <sub>2</sub> (%)            | 44.84  |
| Densidad seca/ Dry Unit weight, $\gamma_d$ (g/cm <sup>3</sup> )   | 1.27   |
| Grado de saturación/ Degree of saturation, S <sub>2</sub> (%)     | 100.00 |



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |     |
|------------------|----------|--------------|-----|------------------|-------|--------------|-----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 3   | Equipo/Equipment | RING  | Serie/Serial | 3   |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A15 |

OBSERVACIONES / REMARKS:

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Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO



**TECNILAB, S.A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S.A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1973

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/  
STANDARD TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF  
COHESIVE SOILS D 4546-08**

**F-131**

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Fecha Efectiva:  
24 de Marzo de 2014

Área:  
Pruebas y Ensayos

Versión:  
0

TRABAJO No./JOB No.

2-1259

SONDEO/ BEROHOLE.:

3

CLIENTE/CLIENT:

SFERA PROPERTIES CORP

MUESTRA/SAMPLE:

M-1

PROYECTO/ PROJECT:

CAVAROSA

PROFUNDIDAD/ DEPTH:

21.00 m - 21.90 m

LOCALIZACION/ LOCATION:

CALZADA DE AMADOR, CIUDAD DE PANAMÁ

FECHA/ DATE:

08-Mar-24

METODO/METHOD:

"A"

TECNICO/ TECHNICIAN:

C.CORDOBA

Presión aplicada a la probeta:

53.2249 kPa

**DATOS INICIALES/INITIAL DATA:**

**Probeta 3**

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)                   | 20.00  |
| Diámetro del suelo/ Diameter of soil, d (mm)                                | 63.50  |
| Peso del suelo/ Specimen weight, W (g)                                      | 113.90 |
| Gravedad Específica del suelo/ Specific Gravity, Gs                         | 2.65   |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )                          | 31.67  |
| Volumen inicial del suelo/ Initial volume of soil, V1 (cm <sup>3</sup> )    | 63.34  |
| Humedad inicial/ Initial Water content, W1 (%)                              | 43.90  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_1$ (g/cm <sup>3</sup> ) | 1.80   |
| Densidad seca/ Dry Unit weight, $\gamma_d1$ (g/cm <sup>3</sup> )            | 1.25   |
| Grado de saturación/ Degree of saturation, S1 (%)                           | 103.82 |

**Contenido de humedad inicial de las taras/ Water Content from tares**

|                                            |       |
|--------------------------------------------|-------|
| Tara No./ Tare No.                         | LM    |
| Tara + suelo húmedo/ Tare + Wet Soil, g    | 99.3  |
| Peso de tara/ Tare mass, g                 | 26.2  |
| Tara + suelo seco/ Tare + dry soil, g      | 77    |
| Contenido de humedad/ Water Content, w (%) | 43.90 |

**DATOS FINALES/FINAL DATA:**

**Probeta 3**

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| Altura final del suelo/ Final height of soil, H2 (mm)                       | 19.63  |
| Peso del suelo/ Specimen weight, W (g)                                      | 115.5  |
| Volumen final del suelo/ Final volume of soil, V2 (cm <sup>3</sup> )        | 62.17  |
| Peso seco del suelo/ Dry weight Wd (g)                                      | 79.50  |
| Humedad final/ Final Water content, W2 (%)                                  | 45.28  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_2$ (g/cm <sup>3</sup> ) | 1.86   |
| Densidad seca/ Dry Unit weight, $\gamma_d2$ (g/cm <sup>3</sup> )            | 1.28   |
| Grado de saturación/ Degree of saturation, S2 (%)                           | 100.00 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |     |
|------------------|----------|--------------|-----|------------------|-------|--------------|-----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 2   | Equipo/Equipment | RING  | Serie/Serial | 2   |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | AR9 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/ STANDARD  
TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

|                                             |      |     |
|---------------------------------------------|------|-----|
| Presión vertical aplicada/ Vertical stress: | 53.2 | kPa |
|---------------------------------------------|------|-----|

|                                                                                                                                                                                  |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)                                                                                                                        | 20.00   |
| Compresión del espécimen después de la aplicación de la carga y antes del inundamiento/ specimen compression after stress application and immediately prior to wetting, Ah1 (mm) | 0.376   |
| Altura espécimen antes de inundar, Specimen height immediately prior to wetting h1 (mm)                                                                                          | 19.624  |
| Variación de la altura del espécimen: hinchamiento o colapso tras inundación/ Change in specimen weight: swell or collapse after wetting Ah2 (mm)                                | 0.008   |
| Altura final del ensayo/ Final specimen height (h2)                                                                                                                              | 19.6317 |
| Hinchamiento o colapso/ Swell or collapse strains, $\epsilon$ (%)                                                                                                                | 0.0388  |

| t (min)                | Lectura dial | Variación altura (mm) |
|------------------------|--------------|-----------------------|
| 0                      | 643          | 0.000                 |
| 0.1                    | 643          | 0.000                 |
| 0.25                   | 643          | 0.000                 |
| 0.5                    | 643          | 0.000                 |
| 1                      | 643          | 0.000                 |
| 2                      | 642          | 0.003                 |
| 4                      | 640          | 0.008                 |
| 8                      | 640          | 0.008                 |
| 15                     | 640          | 0.008                 |
| 30                     | 640          | 0.008                 |
| 60                     | 640          | 0.008                 |
| 120                    | 640          | 0.008                 |
| 240                    | 640          | 0.008                 |
| 480                    | 640          | 0.008                 |
| 1440                   | 640          | 0.008                 |
| 2880                   | 640          | 0.008                 |
| 4320                   | 640          | 0.008                 |
| 5760                   | 640          | 0.008                 |
| <b>VARIACION TOTAL</b> | <b>3.00</b>  | <b>0.008</b>          |

| EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST |          |              |     |                  |              |
|---------------------------------------------------------------|----------|--------------|-----|------------------|--------------|
| Equipo/Equipment                                              | ODOMETER | Serie/Serial | 2   | Equipo/Equipment | RING         |
| Equipo/Equipment                                              | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS        |
|                                                               |          |              |     |                  | Serie/Serial |
|                                                               |          |              |     |                  | 2            |
|                                                               |          |              |     |                  | AR9          |

OBSERVACIONES / REMARKS:

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Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S.A.**  
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TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF COHESIVE  
SOILS D 4546-08**

**F-131**

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TRABAJO No./JOB No.

2-1259

SONDEO/ BEROHOLE.:

3

CLIENTE/CLIENT:

SFERA PROPERTIES CORP

MUESTRA/SAMPLE:

M-1

PROYECTO/ PROJECT:

CAVAROSA

PROFUNDIDAD/ DEPTH:

21.00 m - 21.90 m

LOCALIZACION/ LOCATION:

Calzada de Amador

FECHA/ DATE:

08-Mar-24

METODO/METHOD:

"A"

TECNICO/ TECHNICIAN:

C.CORDOBA

**DATOS FINALES/FINAL DATA:**

**Probeta 3**

Altura final del suelo/ Final height of soil, H<sub>2</sub> (cm)

19.63

Humedad final/ Final Water content, W<sub>2</sub> (%)

45.28

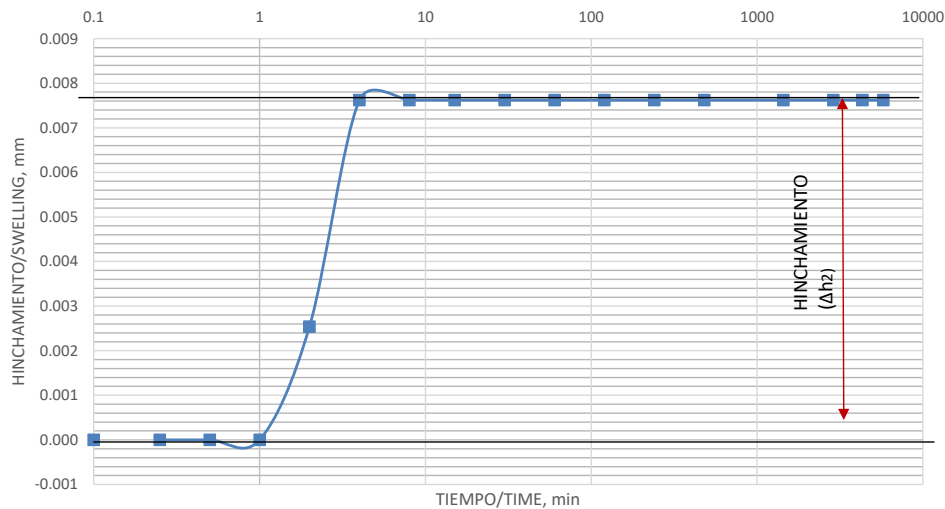
Densidad seca/ Dry Unit weight, γ<sub>d</sub> (g/cm<sup>3</sup>)

1.28

Grado de saturación/ Degree of saturation, S<sub>2</sub> (%)

100.00

**CURVA TIEMPO-HINCHAMIENTO, / TIME-SWELL CURVE**



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |     |
|------------------|----------|--------------|-----|------------------|-------|--------------|-----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 2   | Equipo/Equipment | RING  | Serie/Serial | 2   |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | AR9 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/  
STANDARD TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE  
OF COHESIVE SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Área:  
**Pruebas y Ensayos**

Versión:  
**0**

Página: 10 de 14

|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

**Presión aplicada a la probeta:**

**106.5 kPa**

**DATOS INICIALES/INITIAL DATA:**

**Probeta 4**

|                                                                |        |
|----------------------------------------------------------------|--------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)      | 20.00  |
| Diámetro del suelo/ Diameter of soil, d (mm)                   | 63.50  |
| Peso del suelo/ Specimen weighth, W (g)                        | 110.60 |
| Gravedad Específica del suelo/ Specific Gravity, Gs            | 2.65   |
| Area del suelo/ Area of soil, A (cm <sup>2</sup> )             | 31.67  |
| Volumen inicial del suelo/ Initial volume of soil, V1 (cm3)    | 63.34  |
| Humedad inicial/ Initial Water content, W1 (%)                 | 43.90  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_1$ (g/cm3) | 1.75   |
| Densidad seca/ Dry Unit weighth, $\gamma_{d1}$ (g/cm3)         | 1.21   |
| Grado de saturación/ Degree of saturation, S1 (%)              | 98.27  |

**Contenido de humedad inicial de las taras/ Water Content from tares**

|                                            |       |
|--------------------------------------------|-------|
| Tara No./ Tare No.                         | LM    |
| Tara + suelo húmedo/ Tare + Wet Soil, g    | 99.3  |
| Peso de tara/ Tare mass, g                 | 26.2  |
| Tara + suelo seco/ Tare + dry soil, g      | 77    |
| Contenido de humedad/ Water Content, w (%) | 43.90 |

**DATOS FINALES/FINAL DATA:**

**Probeta 4**

|                                                                |        |
|----------------------------------------------------------------|--------|
| Altura final del suelo/ Final height of soil, H2 (mm)          | 19.24  |
| Peso del suelo/ Specimen weighth, W (g)                        | 112.20 |
| Volumen final del suelo/ Final volume of soil, V2 (cm3)        | 60.92  |
| Peso seco del suelo/ Dry weighth Wd (g)                        | 74.60  |
| Humedad final/ Final Water content, W2 (%)                     | 50.40  |
| Densidad aparente/ Bulk or wet unit weight, $\gamma_2$ (g/cm3) | 1.84   |
| Densidad seca/ Dry Unit weighth, $\gamma_{d2}$ (g/cm3)         | 1.22   |
| Grado de saturación/ Degree of saturation, S2 (%)              | 100.00 |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 4   | Equipo/Equipment | RING  | Serie/Serial | 4  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A1 |

OBSERVACIONES / REMARKS:

Ensayado por/Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/  
STANDARD TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF  
COHESIVE SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
**24 de Marzo de 2014**

Area:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

|                                                    |                |            |
|----------------------------------------------------|----------------|------------|
| <b>Presión vertical aplicada/ Vertical stress:</b> | <b>106.479</b> | <b>kPa</b> |
|----------------------------------------------------|----------------|------------|

|                                                                                                                                                                                  |         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Altura inicial del suelo/ Initial height of soil, Hi (mm)                                                                                                                        | 20.0000 |
| Compresión del espécimen después de la aplicación de la carga y antes del inundamiento/ specimen compression after stress application and immediately prior to wetting, Ah1 (mm) | 0.7595  |
| Altura espécimen antes de inundar, Specimen height immediately prior to wetting h1 (mm)                                                                                          | 19.2405 |
| Variación de la altura del espécimen: hinchamiento o colapso tras inundación/ Change in specimen weight: swell or collapse after wetting Ah2 (mm)                                | -0.003  |
| Altura final del ensayo/ Final specimen height (h2)                                                                                                                              | 19.2380 |
| Hinchamiento o colapso/ Swell or collapse strains, $\epsilon$ (%)                                                                                                                | -0.0132 |

| t (min)                | Lectura dial | Varciación altura (mm) |
|------------------------|--------------|------------------------|
| 0                      | 656          | 0.000                  |
| 0.1                    | 656          | 0.000                  |
| 0.25                   | 656          | 0.000                  |
| 0.5                    | 656          | 0.000                  |
| 1                      | 656          | 0.000                  |
| 2                      | 656          | 0.000                  |
| 4                      | 656          | 0.000                  |
| 8                      | 656          | 0.000                  |
| 15                     | 656          | 0.000                  |
| 30                     | 656          | 0.000                  |
| 60                     | 657          | -0.003                 |
| 120                    | 657          | -0.003                 |
| 240                    | 657          | -0.003                 |
| 360                    | 657          | -0.003                 |
| 1440                   | 657          | -0.003                 |
| 2880                   | 657          | -0.003                 |
| 4320                   | 657          | -0.003                 |
| 5760                   | 657          | -0.003                 |
| <b>VARIACION TOTAL</b> | <b>1.000</b> | <b>-0.003</b>          |

| EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST |          |              |     |                  |       |              |    |
|---------------------------------------------------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment                                              | ODOMETER | Serie/Serial | 4   | Equipo/Equipment | RING  | Serie/Serial | 4  |
| Equipo/Equipment                                              | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A1 |

OBSERVACIONES / REMARKS:

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Ensayado por/ Tested by: C. CORDOBA  
 Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
 Presentado por / Presented by: L. NAVARRO

Fecha Efectiva:  
24 de Marzo de 2014

Area:  
Pruebas y Ensayos

Versión:  
0

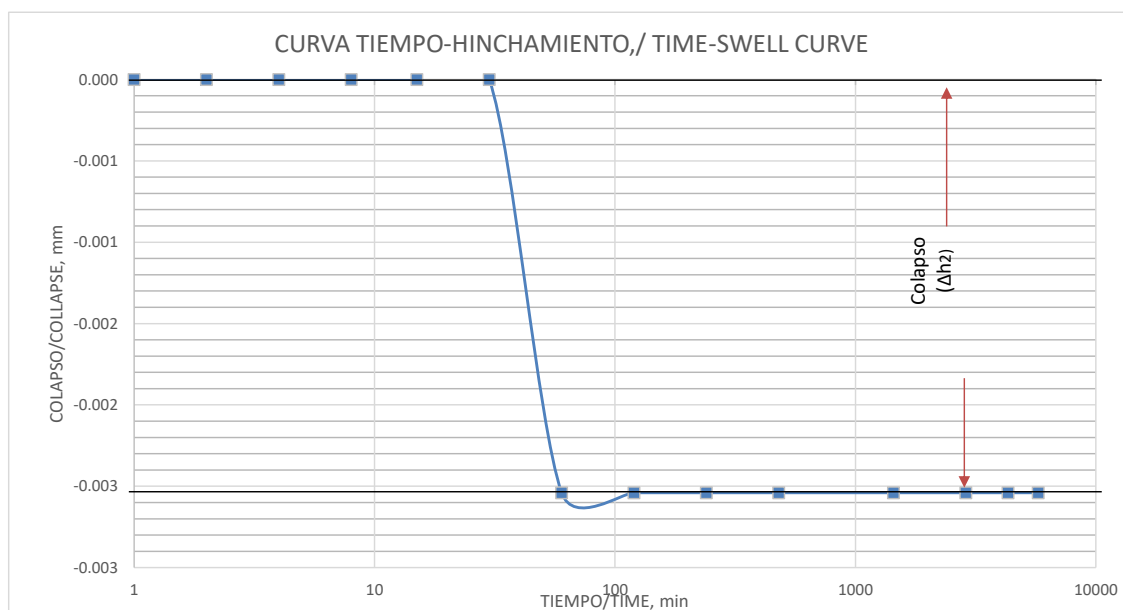
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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | M-1               |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C.CORDOBA         |

**DATOS FINALES/FINAL DATA:**

**Probeta 4**

|                                                                       |        |
|-----------------------------------------------------------------------|--------|
| Altura final del suelo/ Final height of soil, H <sub>2</sub> (cm)     | 19.24  |
| Humedad final/ Final Water content, W <sub>2</sub> (%)                | 50.40  |
| Densidad seca/ Dry Unit weighth, γ <sub>d2</sub> (g/cm <sup>3</sup> ) | 1.22   |
| Grado de saturación/ Degree of saturation, S <sub>2</sub> (%)         | 100.00 |



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |     |                  |       |              |    |
|------------------|----------|--------------|-----|------------------|-------|--------------|----|
| Equipo/Equipment | ODOMETER | Serie/Serial | 4   | Equipo/Equipment | RING  | Serie/Serial | 4  |
| Equipo/Equipment | BALANCE  | Serie/Serial | 927 | Equipo/Equipment | GLASS | Serie/Serial | A1 |

OBSERVACIONES / REMARKS:

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO

Fecha Efectiva:  
**24 de Marzo de 2014**

Área:  
**Pruebas y Ensayos**

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**13 de 14**

TRABAJO No./JOB No. **2-1259**  
CLIENTE/CLIENT: **SFERA PROPERTIES CORP**

SONDEO/ BEROHOLE.: **3**  
MUESTRA/SAMPLE: **----**

PROYECTO/ PROJECT: **CAVAROSA**

PROFUNDIDAD/ DEPTH: **21.00 m - 21.90 m**

LOCALIZACION/ LOCATION: **CALZADA DE AMADOR, CIUDAD DE PANAMÁ**

FECHA/ DATE: **08-Mar-24**

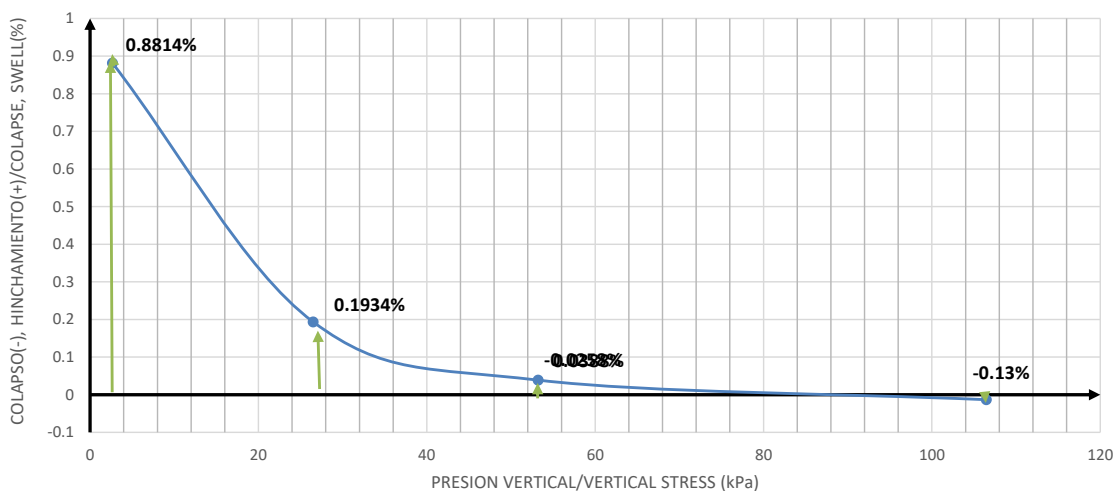
METODO/METHOD: **"A"**

TECNICO/ TECHNICIAN: **C. CORDOBA**

**DATOS FINALES/FINAL DATA:**

|                                                                        | Probeta 1 | Probeta 2 | Probeta 3 | Probeta 4 |
|------------------------------------------------------------------------|-----------|-----------|-----------|-----------|
| Altura final del suelo/ Final height of soil, H <sub>2</sub> (cm)      | 20.06     | 19.74     | 19.63     | 19.24     |
| Humedad final/ Final Water content, w <sub>2</sub> (%)                 | 84.49     | 44.84     | 45.28     | 50.40     |
| Densidad aparente/Wet unit weight, g <sub>2</sub> (g/cm <sup>3</sup> ) | 1.25      | 1.84      | 1.86      | 1.84      |
| Densidad seca/ Dry Unit weighth, γ <sub>d2</sub> (g/cm <sup>3</sup> )  | 0.68      | 1.27      | 1.28      | 1.22      |
| Grado de saturación/ Degree of saturation, S <sub>2</sub> (%)          | 77.30     | 100.00    | 100.00    | 100.00    |

**CURVA HINCHAMIENTO-COLAPSO/ SWELL-COLLAPSE CURVE**



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |                  |       |              |
|------------------|----------|--------------|------------------|-------|--------------|
| Equipo/Equipment | ODOMETER | Serie/Serial | Equipo/Equipment | RING  | Serie/Serial |
| Equipo/Equipment | BALANCE  | Serie/Serial | Equipo/Equipment | GLASS | Serie/Serial |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: **C. CORDOBA**  
Compilado por / Compiled by: **L. NAVARRO**

Revisado por/ Reviewed by: **L. NAVARRO**  
Presentado por / Presented by: **L. NAVARRO**



**TECNILAB, S. A.**  
UNA EMPRESA E BARRANCO Y ASOC. S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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**ENSAYO DE HINCHAMIENTO O COLAPSO PARA SUELOS COHESIVOS/  
STANDARD TEST METHODS FOR ONE-DIMENSIONAL SWELL OR COLLAPSE OF  
COHESIVE SOILS D 4546-08**

**F-131**

Fecha Efectiva:  
24 de Marzo de 2014

Área:  
Pruebas y Ensayos

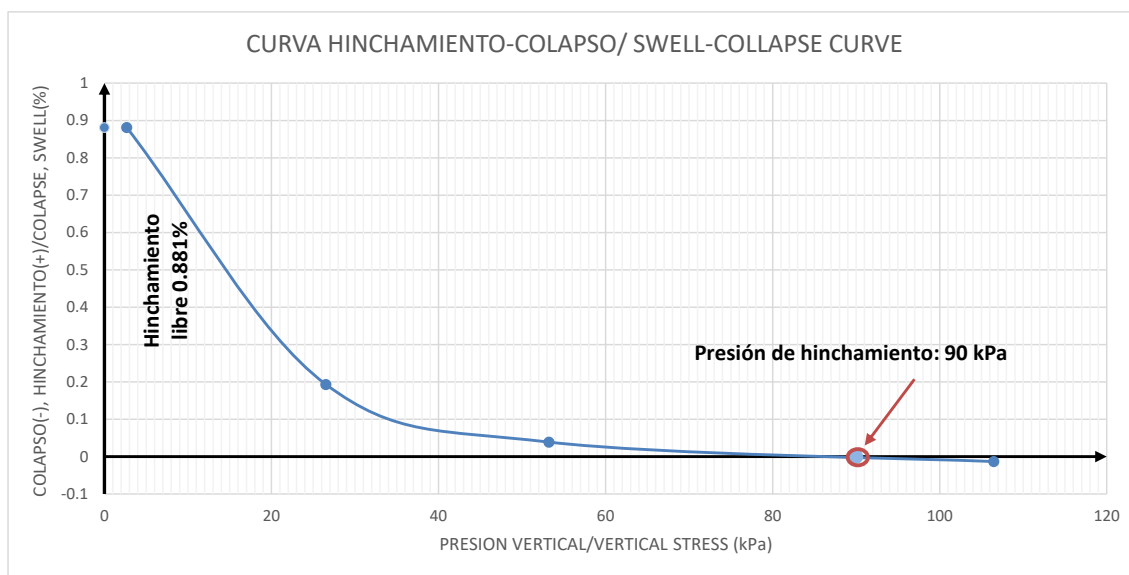
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|                         |                                     |                      |                   |
|-------------------------|-------------------------------------|----------------------|-------------------|
| TRABAJO No./JOB No.     | 2-1259                              | SONDEO/ BEROHOLE.:   | 3                 |
| CLIENTE/CLIENT:         | SFERA PROPERTIES CORP               | MUESTRA/SAMPLE:      | ----              |
| PROYECTO/ PROJECT:      | CAVAROSA                            | PROFUNDIDAD/ DEPTH:  | 21.00 m - 21.90 m |
| LOCALIZACION/ LOCATION: | CALZADA DE AMADOR, CIUDAD DE PANAMÁ | FECHA/ DATE:         | 08-Mar-24         |
| METODO/METHOD:          | "A"                                 | TECNICO/ TECHNICIAN: | C. CORDOBA        |

**PRESION DE HINCHAMIENTO (kPa)** **90.0**

**HINCHAMIENTO LIBRE (%)** **0.881**



**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |          |              |                  |       |              |
|------------------|----------|--------------|------------------|-------|--------------|
| Equipo/Equipment | ODOMETER | Serie/Serial | Equipo/Equipment | RING  | Serie/Serial |
| Equipo/Equipment | BALANCE  | Serie/Serial | Equipo/Equipment | GLASS | Serie/Serial |

OBSERVACIONES / REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Ensayado por/ Tested by: C. CORDOBA  
Compilado por / Compiled by: L. NAVARRO

Revisado por/ Reviewed by: L. NAVARRO  
Presentado por / Presented by: L. NAVARRO



**TECNILAB, S.**  
UNA EMPRESA E. BARRANCO Y ASOC., S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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## INFORME DE ANALISIS QUIMICO

Proyecto No. 2-1259  
Proyecto: CAVAROSA  
Cliente SFERA PROPERTIES CORP  
Muestreado por: TECNILAB, S.A. Fecha: MARZO, 2024  
No. 90-2024 Fecha: MARZO, 2024

| Referencia No. | SONDEO No.      |        |             | 1             |
|----------------|-----------------|--------|-------------|---------------|
|                | TIPO            |        |             | SUELO         |
|                | PROFUNDIDAD (m) |        |             | 13.50 - 13.95 |
|                | Ensayo          | Unidad | Método      | Resultado     |
| 1              | Sulfatos        | mg/kg  | ASTM C-1580 | 520.14        |
|                |                 | %      |             | 0.052014      |

REVISADO POR: M. JARAMILLO

PRESENTADO POR: L. NAVARRO

SFERA PROPERTIES CORP

CAVAROSA

TRABAJO No. 2-1259

RESULTADOS DE ENSAYOS DE LABORATORIO

| SONDEO No. | MUESTRA | PROFUNDIDAD<br>(m) |   |       | DESCRIPCIÓN  | DENSIDAD g/cm <sup>3</sup> | ESFUERZO A COMPRESION |       | RQD |
|------------|---------|--------------------|---|-------|--------------|----------------------------|-----------------------|-------|-----|
|            |         |                    |   |       |              |                            | kg/cm <sup>2</sup>    | MPa   | %   |
| 1          | 1       | 21.10              | - | 21.30 | CONGLOMERADO | 2.02                       | 254.01                | 24.91 | 100 |
|            | 2       | 23.30              | - | 23.50 | CONGLOMERADO | 2.06                       | 218.97                | 21.47 | 100 |
|            | 3       | 25.80              | - | 26.00 | CONGLOMERADO | 2.03                       | 209.74                | 20.57 | 100 |
| 2          | 1       | 18.90              | - | 19.10 | CONGLOMERADO | 2.51                       | 243.64                | 23.89 | 100 |
|            | 2       | 21.10              | - | 21.30 | CONGLOMERADO | 2.44                       | 141.95                | 13.92 | 100 |
|            | 3       | 23.30              | - | 23.50 | CONGLOMERADO | 2.41                       | 121.71                | 11.94 | 100 |
| 3          | 1       | 24.00              | - | 24.30 | CONGLOMERADO | 2.36                       | 211.08                | 20.70 | 100 |
|            | 2       | 25.70              | - | 25.90 | CONGLOMERADO | 2.38                       | 136.53                | 13.39 | 100 |
|            | 3       | 27.65              | - | 27.85 | CONGLOMERADO | 2.37                       | 74.65                 | 7.32  | 100 |
| 4          | 1       | 24.55              | - | 24.75 | CONGLOMERADO | 2.41                       | 170.34                | 16.70 | 100 |
|            | 2       | 26.70              | - | 26.90 | CONGLOMERADO | 2.43                       | 199.21                | 19.54 | 100 |
|            | 3       | 28.85              | - | 29.05 | CONGLOMERADO | 2.42                       | 158.83                | 15.58 | 100 |
| 5          | 1       | 25.50              | - | 25.40 | CONGLOMERADO | 2.39                       | 226.48                | 22.21 | 100 |
|            | 2       | 27.25              | - | 27.45 | CONGLOMERADO | 2.42                       | 167.49                | 16.42 | 100 |
|            | 3       | 29.40              | - | 29.60 | CONGLOMERADO | 2.41                       | 180.96                | 17.75 | 100 |



**TECNILAB, S.A.**  
UNA EMPRESA E. BARRANCO Y ASOC., S.A.  
LABORATORIO DE SUELOS Y MATERIALES

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Area/Area:  
Pruebas y Ensayos / Test And Trials

**RESISTENCIA EN COMPRESIÓN DE TESTIGO DE ROCA / METHOD FOR COMPRESSIVE  
STRENGTH OF INTACT ROCK CORE SPECIMENS  
ASTM D 7012**

F-089

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TRABAJO No./JOB: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/PROJECT: CAVAROSA LOCALIZACION / LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
MUESTREO POR/SAMPLE BY: TECNILAB, S.A. FECHA/DATE: feb-24  
ENSAYADO POR/PREPARED BY: TECNILAB, S.A. FECHA/DATE: feb-24 LABORATORISTA/TECHNICIAN: A. PERALTA

| HOYO /HOLE | MUESTRA/ SAMPLE          | ELEVACIÓN<br>(ELEVATION) | PESO<br>(WEIGHT) g | DIAMETRO<br>(DIAMETER) | LARGO<br>(LENGHT) | AREA<br>TRANSVERSAL                        | VOLUMEN<br>(VOLUME) | DENSIDAD<br>(DENSITY) | RELACION/<br>RATIO | CARGA<br>MAXIMA<br>(MAXIMUM<br>LOAD) | RESIS.<br>MAXIMA/<br>MAXIMUM<br>STRENGHT<br>(kg/cm <sup>2</sup> ) | RESISTENCIA EN<br>COMPRESION.<br>AXIAL (AXIAL<br>COMPRESSIVE<br>STRENGHT)<br>MPa |
|------------|--------------------------|--------------------------|--------------------|------------------------|-------------------|--------------------------------------------|---------------------|-----------------------|--------------------|--------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|
| No.        | Profundidad (DEPTH)<br>m |                          |                    | ( cm )                 | ( cm )            | TRANSVERSAL<br>AREA<br>( cm <sup>2</sup> ) | ( cm <sup>3</sup> ) | ( g/cm <sup>3</sup> ) | L/D                | MAXIMUN<br>LOAD (lb)                 |                                                                   |                                                                                  |
| 1          | 21.10 - 21.30            | --                       | 793.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.02                  | 2.00               | 17419.60                             | 254.01                                                            | 24.91                                                                            |
|            | 23.30 - 23.50            | --                       | 811.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.06                  | 2.00               | 15017.20                             | 218.97                                                            | 21.47                                                                            |
|            | 25.80 - 26.00            | --                       | 796.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.03                  | 2.00               | 14383.60                             | 209.74                                                            | 20.57                                                                            |
| 2          | 18.90 - 19.10            | --                       | 985.30             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.51                  | 2.00               | 16709.00                             | 243.64                                                            | 23.89                                                                            |
|            | 21.10 - 21.30            | --                       | 957.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.44                  | 2.00               | 9735.00                              | 141.95                                                            | 13.92                                                                            |
|            | 23.30 - 23.50            | --                       | 948.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.41                  | 2.00               | 8346.80                              | 121.71                                                            | 11.94                                                                            |
| 3          | 24.00 - 24.30            | --                       | 928.50             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.36                  | 2.00               | 14476.00                             | 211.08                                                            | 20.70                                                                            |
|            | 25.70 - 25.90            | --                       | 933.80             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.38                  | 2.00               | 9363.20                              | 136.53                                                            | 13.39                                                                            |
|            | 27.65 - 27.85            | --                       | 930.30             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.37                  | 2.00               | 5119.40                              | 74.65                                                             | 7.32                                                                             |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |                             |              |             |                  |               |              |            |
|------------------|-----------------------------|--------------|-------------|------------------|---------------|--------------|------------|
| Equipo/Equipment | <u>BALANZA</u>              | Serie/Serial | <u>514</u>  | Equipo/Equipment | <u>--</u>     | Serie/Serial | <u>--</u>  |
| Equipo/Equipment | <u>MÁQUINA CORTA NÚCLEO</u> | Serie/Serial | <u>1067</u> | Equipo/Equipment | <u>PRENSA</u> | Serie/Serial | <u>512</u> |

**OBSERVACIONES/REMARKS:**

Muestreado por/Sample By: TECNILAB, S.A.  
Compilado por/Compiled: A. HERNÁNDEZ

Ensayado por/ Tested By: A. PERALTA  
Presentado por/Presented By: TECNILAB, S.A.

El presente informe no deberá reproducirse, sin la aprobación escrita de TECNILAB, S.A.  
Los resultados de este informe sólo están relacionados con las muestras indicadas en el mismo.

Fecha de Revisión: 15-mar-2018

Versión: 2



**TECNILAB, S.A.**  
UNA EMPRESA E. BARRANCO Y ASOC. S. A.  
LABORATORIO DE SUELOS Y MATERIALES

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Area/Area:  
Pruebas y Ensayos / Test And Trials

**RESISTENCIA EN COMPRESIÓN DE TESTIGO DE ROCA / METHOD FOR COMPRESSIVE  
STRENGTH OF INTACT ROCK CORE SPECIMENS  
ASTM D 7012**

F-089

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TRABAJO No./JOB: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP  
PROYECTO/PROJECT: CAVAROSA LOCALIZACION / LOCATION: CALZADA DE AMADOR, CIUDAD DE PANAMÁ  
MUESTREADO POR/SAMPLE BY: TECNILAB, S.A. FECHA/DATE: mar-24  
ENSAYADO POR/PREPARED BY: TECNILAB, S.A. FECHA/DATE: mar-24 LABORATORISTA/TECHNICIAN: A. PERALTA

| HOYO /HOLE | MUESTRA/ SAMPLE          | ELEVACIÓN<br>(ELEVATION) | PESO<br>(WEIGHT) g | DIAMETRO<br>(DIAMETER) | LARGO<br>(LENGHT) | AREA<br>TRANSVERSAL                        | VOLUMEN<br>(VOLUME) | DENSIDAD<br>(DENSITY) | RELACION/<br>RATIO | CARGA<br>MAXIMA<br>(MAXIMUM<br>LOAD) | RESIS.<br>MAXIMA/<br>MAXIMUM<br>STRENGHT<br>(kg/cm <sup>2</sup> ) | RESISTENCIA EN<br>COMPRESION.<br>AXIAL (AXIAL<br>COMPRESSIVE<br>STRENGHT)<br>MPa |
|------------|--------------------------|--------------------------|--------------------|------------------------|-------------------|--------------------------------------------|---------------------|-----------------------|--------------------|--------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|
| No.        | Profundidad (DEPTH)<br>m |                          |                    | ( cm )                 | ( cm )            | TRANSVERSAL<br>AREA<br>( cm <sup>2</sup> ) | ( cm <sup>3</sup> ) | ( g/cm <sup>3</sup> ) | L/D                | MAXIMUN<br>LOAD (lb)                 |                                                                   |                                                                                  |
| 4          | 24.55 - 24.75            | --                       | 946.50             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.41                  | 2.00               | 11682.00                             | 170.34                                                            | 16.70                                                                            |
|            | 26.70 - 26.90            | --                       | 956.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.43                  | 2.00               | 13662.00                             | 199.21                                                            | 19.54                                                                            |
|            | 28.85 - 29.05            | --                       | 951.00             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.42                  | 2.00               | 10892.20                             | 158.83                                                            | 15.58                                                                            |
| 5          | 25.20 - 25.40            | --                       | 937.10             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.39                  | 2.00               | 15532.00                             | 226.48                                                            | 22.21                                                                            |
|            | 27.25 - 27.45            | --                       | 949.10             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.42                  | 2.00               | 11486.20                             | 167.49                                                            | 16.42                                                                            |
|            | 29.40 - 29.60            | --                       | 946.50             | 6.30                   | 12.60             | 31.17                                      | 392.77              | 2.41                  | 2.00               | 12410.20                             | 180.96                                                            | 17.75                                                                            |

**EQUIPO UTILIZADO PARA LA PRUEBA / EQUIPMENT USED FOR THE TEST**

|                  |                             |              |             |                  |               |              |            |
|------------------|-----------------------------|--------------|-------------|------------------|---------------|--------------|------------|
| Equipo/Equipment | <u>BALANZA</u>              | Serie/Serial | <u>514</u>  | Equipo/Equipment | <u>--</u>     | Serie/Serial | <u>--</u>  |
| Equipo/Equipment | <u>MÁQUINA CORTA NÚCLEO</u> | Serie/Serial | <u>1067</u> | Equipo/Equipment | <u>PRENSA</u> | Serie/Serial | <u>512</u> |

**OBSERVACIONES/REMARKS:**

Muestreado por/Sample By: TECNILAB, S.A.  
Compilado por/Compiled: A. HERNÁNDEZ

Ensayado por/ Tested By: A. PERALTA  
Presentado por/Presented By: TECNILAB, S.A.

El presente informe no deberá reproducirse, sin la aprobación escrita de TECNILAB, S.A.  
Los resultados de este informe sólo están relacionados con las muestras indicadas en el mismo.

Fecha de Revisión: 15-mar-2018

Versión: 2



**APENDICE N**  
**PRUEBAS DE PLACA**

**TECNILAB, S. A.**

Fecha:  
**15 de Abril de 2011**

Área:  
**Pruebas y Ensayos**

Versión:  
**0**

Página:  
**1 de 2**

TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-1

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

| T<br>min | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE<br>(Kg/cm2) | ESFUERZO/ STRESS<br>(kPa) | VALORES DE DEFORMACION/STRAIN VALUE |                                       |                                       | DEFORMACION<br>mm |
|----------|---------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------------------|---------------------------------------|-------------------|
|          |                     |                                  |                           | Deformimetro/<br>Gauge 1<br>mm      | Deformimetro/<br>Strain Gauge 2<br>mm | Deformimetro/<br>Strain Gauge 3<br>mm |                   |
| 0        | 3,618.6             | 0.80                             | 78.20                     | 1.270                               | 0.864                                 | 1.016                                 | 1.101             |
| 1        | 3,618.6             | 0.80                             | 78.20                     | 1.321                               | 0.914                                 | 1.067                                 |                   |
| 2        | 3,618.6             | 0.80                             | 78.20                     | 1.321                               | 0.914                                 | 1.067                                 |                   |
| 3        | 3,618.6             | 0.80                             | 78.20                     | 1.321                               | 0.914                                 | 1.067                                 |                   |
| 0        | 7,237.1             | 1.60                             | 156.40                    | 2.616                               | 1.651                                 | 2.210                                 | 2.557             |
| 1        | 7,237.1             | 1.60                             | 156.40                    | 2.540                               | 1.397                                 | 2.032                                 |                   |
| 2        | 7,237.1             | 1.60                             | 156.40                    | 2.591                               | 1.473                                 | 2.057                                 |                   |
| 3        | 7,237.1             | 1.60                             | 156.40                    | 2.794                               | 1.702                                 | 2.311                                 |                   |
| 4        | 7,237.1             | 1.60                             | 156.40                    | 2.667                               | 1.499                                 | 2.235                                 |                   |
| 5        | 7,237.1             | 1.60                             | 156.40                    | 2.946                               | 1.803                                 | 2.438                                 |                   |
| 6        | 7,237.1             | 1.60                             | 156.40                    | 3.023                               | 1.905                                 | 2.489                                 |                   |
| 7        | 7,237.1             | 1.60                             | 156.40                    | 2.794                               | 1.626                                 | 2.184                                 |                   |
| 8        | 7,237.1             | 1.60                             | 156.40                    | 2.642                               | 1.422                                 | 2.108                                 |                   |
| 9        | 7,237.1             | 1.60                             | 156.40                    | 2.794                               | 1.702                                 | 2.337                                 |                   |
| 10       | 7,237.1             | 1.60                             | 156.40                    | 3.048                               | 1.905                                 | 2.515                                 |                   |
| 11       | 7,237.1             | 1.60                             | 156.40                    | 3.099                               | 1.981                                 | 2.591                                 |                   |
| 12       | 7,237.1             | 1.60                             | 156.40                    | 3.099                               | 1.981                                 | 2.591                                 |                   |
| 0        | 10,855.7            | 2.39                             | 234.61                    | 3.810                               | 2.032                                 | 3.048                                 | 3.878             |
| 1        | 10,855.7            | 2.39                             | 234.61                    | 3.785                               | 1.981                                 | 3.048                                 |                   |
| 2        | 10,855.7            | 2.39                             | 234.61                    | 3.861                               | 2.083                                 | 3.073                                 |                   |
| 3        | 10,855.7            | 2.39                             | 234.61                    | 3.861                               | 2.083                                 | 3.073                                 |                   |
| 4        | 10,855.7            | 2.39                             | 234.61                    | 4.318                               | 2.464                                 | 3.429                                 |                   |
| 5        | 10,855.7            | 2.39                             | 234.61                    | 4.521                               | 2.769                                 | 3.759                                 |                   |
| 6        | 10,855.7            | 2.39                             | 234.61                    | 4.623                               | 2.845                                 | 3.810                                 |                   |
| 7        | 10,855.7            | 2.39                             | 234.61                    | 4.699                               | 2.921                                 | 3.886                                 |                   |
| 8        | 10,855.7            | 2.39                             | 234.61                    | 4.724                               | 2.972                                 | 3.937                                 |                   |
| 9        | 10,855.7            | 2.39                             | 234.61                    | 4.724                               | 2.972                                 | 3.937                                 |                   |
| 0        | 14,474.2            | 3.19                             | 312.81                    | 6.172                               | 3.632                                 | 5.105                                 | 5.927             |
| 1        | 14,474.2            | 3.19                             | 312.81                    | 6.299                               | 3.708                                 | 5.207                                 |                   |
| 2        | 14,474.2            | 3.19                             | 312.81                    | 6.350                               | 3.785                                 | 5.309                                 |                   |
| 3        | 14,474.2            | 3.19                             | 312.81                    | 6.426                               | 3.835                                 | 5.385                                 |                   |
| 4        | 14,474.2            | 3.19                             | 312.81                    | 6.528                               | 3.937                                 | 5.486                                 |                   |
| 5        | 14,474.2            | 3.19                             | 312.81                    | 6.604                               | 3.988                                 | 5.537                                 |                   |
| 6        | 14,474.2            | 3.19                             | 312.81                    | 6.655                               | 4.013                                 | 7.112                                 |                   |
| 7        | 14,474.2            | 3.19                             | 312.81                    | 6.655                               | 4.013                                 | 7.112                                 |                   |
| 0        | 18,092.8            | 3.99                             | 391.01                    | 7.849                               | 4.343                                 | 4.445                                 | 6.020             |
| 1        | 18,092.8            | 3.99                             | 391.01                    | 8.052                               | 4.420                                 | 4.674                                 |                   |
| 2        | 18,092.8            | 3.99                             | 391.01                    | 8.153                               | 4.470                                 | 4.775                                 |                   |
| 3        | 18,092.8            | 3.99                             | 391.01                    | 8.077                               | 4.369                                 | 4.648                                 |                   |
| 4        | 18,092.8            | 3.99                             | 391.01                    | 8.255                               | 4.547                                 | 4.877                                 |                   |
| 5        | 18,092.8            | 3.99                             | 391.01                    | 8.331                               | 4.597                                 | 4.978                                 |                   |
| 6        | 18,092.8            | 3.99                             | 391.01                    | 8.255                               | 4.547                                 | 4.877                                 |                   |
| 7        | 18,092.8            | 3.99                             | 391.01                    | 8.407                               | 4.877                                 | 5.029                                 |                   |
| 8        | 18,092.8            | 3.99                             | 391.01                    | 8.433                               | 4.597                                 | 5.029                                 |                   |
| 9        | 18,092.8            | 3.99                             | 391.01                    | 8.433                               | 4.597                                 | 5.029                                 |                   |

Fecha:  
15 de Abril de 2011

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TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-1

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

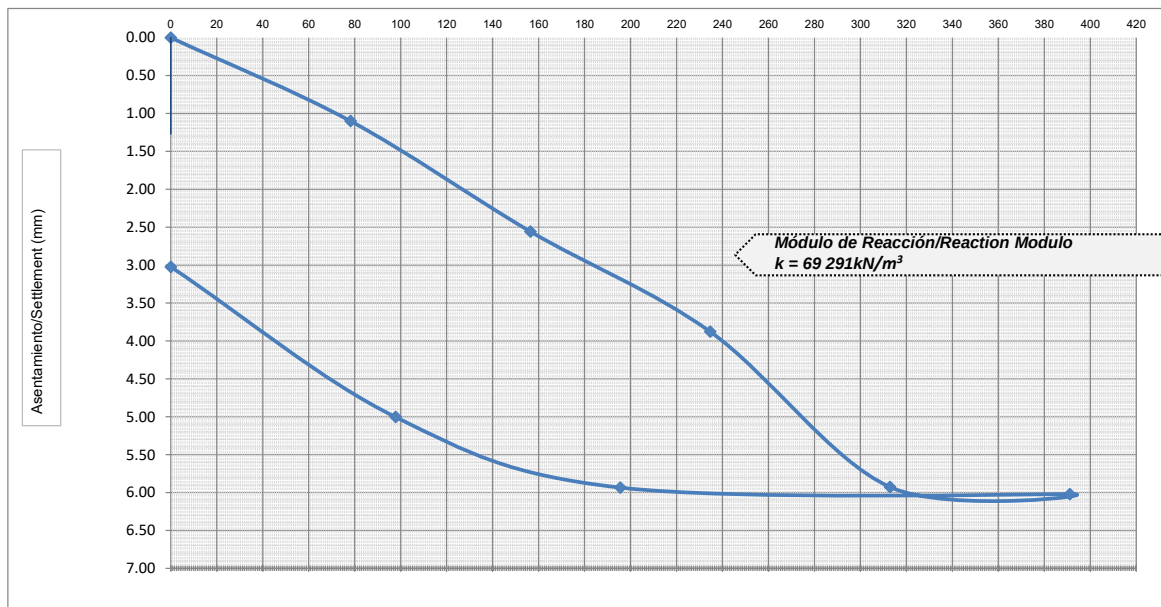
DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

| T<br>min | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE<br>(Kg/cm2) | ESFUERZO/ STRESS<br>(kPa) | VALORES DE DEFORMACION/STRAIN VALUE |                                       |                                       | DEFORMACION<br>mm |
|----------|---------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------------------|---------------------------------------|-------------------|
|          |                     |                                  |                           | Deformimetro/<br>Gauge 1<br>mm      | Deformimetro/<br>Strain Gauge 2<br>mm | Deformimetro/<br>Strain Gauge 3<br>mm |                   |
| 0        | 9,046.4             | 1.99                             | 195.50                    | 8.280                               | 4.648                                 | 4.953                                 | 5.935             |
| 1        | 9,046.4             | 1.99                             | 195.50                    | 8.280                               | 4.597                                 | 4.953                                 |                   |
| 2        | 9,046.4             | 1.99                             | 195.50                    | 8.255                               | 4.597                                 | 4.953                                 |                   |
| 3        | 9,046.4             | 1.99                             | 195.50                    | 8.255                               | 4.597                                 | 4.953                                 |                   |
| 0        | 4,523.2             | 1.00                             | 97.75                     | 7.417                               | 4.369                                 | 4.064                                 | 5.004             |
| 1        | 4,523.2             | 1.00                             | 97.75                     | 7.264                               | 3.988                                 | 4.013                                 |                   |
| 2        | 4,523.2             | 1.00                             | 97.75                     | 7.264                               | 3.988                                 | 3.810                                 |                   |
| 3        | 4,523.2             | 1.00                             | 97.75                     | 7.214                               | 3.988                                 | 3.810                                 |                   |
| 4        | 4,523.2             | 1.00                             | 97.75                     | 7.214                               | 3.988                                 | 3.810                                 |                   |
| 0        | 0.0                 | 0.00                             | 0.00                      | 5.639                               | 2.311                                 | 1.905                                 | 3.023             |
| 1        | 0.0                 | 0.00                             | 0.00                      | 5.512                               | 2.261                                 | 1.854                                 |                   |
| 2        | 0.0                 | 0.00                             | 0.00                      | 5.436                               | 2.210                                 | 1.778                                 |                   |
| 3        | 0.0                 | 0.00                             | 0.00                      | 5.436                               | 2.210                                 | 1.727                                 |                   |
| 4        | 0.0                 | 0.00                             | 0.00                      | 5.359                               | 2.134                                 | 1.651                                 |                   |
| 5        | 0.0                 | 0.00                             | 0.00                      | 5.334                               | 2.134                                 | 1.600                                 |                   |
| 6        | 0.0                 | 0.00                             | 0.00                      | 5.334                               | 2.134                                 | 1.600                                 |                   |

PRUEBA FINALIZADA

GRAFICO DE ASENTAMIENTO VS PRESION/SETTLEMENT VS PRESSURE CHART



OBSERVACIONES/REMARKS: Las lecturas de deformación, los valores suben y bajan hasta estabilizarse

ENSAYADO POR/TESTED BY: E. Peralta  
REVISADO POR/REVIEWED BY: L. Navarro

COMPILADO POR/COMPILED BY: L. Navarro

Fecha:  
**15 de Abril de 2011**

Área:  
**Pruebas y Ensayos**

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**0**

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TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-2

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

| T<br>min | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE<br>(Kg/cm2) | ESFUERZO/ STRESS<br>(kPa) | VALORES DE DEFORMACION/STRAIN VALUE |                                       |                                       | DEFORMACION<br>mm |
|----------|---------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------------------|---------------------------------------|-------------------|
|          |                     |                                  |                           | Deformimetro/<br>Gauge 1<br>mm      | Deformimetro/<br>Strain Gauge 2<br>mm | Deformimetro/<br>Strain Gauge 3<br>mm |                   |
| 0        | 4,523.2             | 1.00                             | 97.75                     | 1.041                               | 2.438                                 | 1.118                                 | 1.981             |
| 1        | 4,523.2             | 1.00                             | 97.75                     | 1.092                               | 2.464                                 | 1.168                                 |                   |
| 2        | 4,523.2             | 1.00                             | 97.75                     | 1.245                               | 2.388                                 | 1.295                                 |                   |
| 3        | 4,523.2             | 1.00                             | 97.75                     | 1.016                               | 2.362                                 | 1.118                                 |                   |
| 4        | 4,523.2             | 1.00                             | 97.75                     | 1.143                               | 2.489                                 | 1.270                                 |                   |
| 5        | 4,523.2             | 1.00                             | 97.75                     | 1.321                               | 2.921                                 | 1.397                                 |                   |
| 6        | 4,523.2             | 1.00                             | 97.75                     | 1.422                               | 3.023                                 | 1.499                                 |                   |
| 7        | 4,523.2             | 1.00                             | 97.75                     | 1.194                               | 2.667                                 | 1.270                                 |                   |
| 8        | 4,523.2             | 1.00                             | 97.75                     | 1.295                               | 2.845                                 | 1.397                                 |                   |
| 9        | 4,523.2             | 1.00                             | 97.75                     | 1.448                               | 3.073                                 | 1.524                                 |                   |
| 10       | 4,523.2             | 1.00                             | 97.75                     | 1.143                               | 2.667                                 | 1.473                                 |                   |
| 11       | 4,523.2             | 1.00                             | 97.75                     | 1.397                               | 3.200                                 | 1.499                                 |                   |
| 12       | 4,523.2             | 1.00                             | 97.75                     | 1.499                               | 3.099                                 | 1.346                                 |                   |
| 13       | 4,523.2             | 1.00                             | 97.75                     | 1.499                               | 3.099                                 | 1.346                                 |                   |
| 0        | 9,046.4             | 1.99                             | 195.50                    | 2.667                               | 3.937                                 | 2.667                                 | 3.683             |
| 1        | 9,046.4             | 1.99                             | 195.50                    | 2.997                               | 4.293                                 | 2.896                                 |                   |
| 2        | 9,046.4             | 1.99                             | 195.50                    | 3.124                               | 4.420                                 | 2.997                                 |                   |
| 3        | 9,046.4             | 1.99                             | 195.50                    | 3.226                               | 4.521                                 | 3.099                                 |                   |
| 4        | 9,046.4             | 1.99                             | 195.50                    | 3.302                               | 4.572                                 | 3.175                                 |                   |
| 5        | 9,046.4             | 1.99                             | 195.50                    | 3.302                               | 4.572                                 | 3.175                                 | 5.901             |
| 0        | 13,569.6            | 2.99                             | 293.26                    | 5.080                               | 5.969                                 | 4.623                                 |                   |
| 1        | 13,569.6            | 2.99                             | 293.26                    | 5.309                               | 6.121                                 | 4.826                                 |                   |
| 2        | 13,569.6            | 2.99                             | 293.26                    | 5.436                               | 6.223                                 | 4.902                                 |                   |
| 3        | 13,569.6            | 2.99                             | 293.26                    | 5.207                               | 5.918                                 | 4.724                                 |                   |
| 4        | 13,569.6            | 2.99                             | 293.26                    | 5.410                               | 6.198                                 | 4.953                                 |                   |
| 5        | 13,569.6            | 2.99                             | 293.26                    | 5.563                               | 6.350                                 | 5.029                                 |                   |
| 6        | 13,569.6            | 2.99                             | 293.26                    | 5.639                               | 6.452                                 | 5.131                                 |                   |
| 7        | 13,569.6            | 2.99                             | 293.26                    | 5.715                               | 6.477                                 | 5.207                                 |                   |
| 8        | 13,569.6            | 2.99                             | 293.26                    | 5.766                               | 6.528                                 | 5.207                                 |                   |
| 9        | 13,569.6            | 2.99                             | 293.26                    | 5.817                               | 6.604                                 | 5.283                                 |                   |
| 10       | 13,569.6            | 2.99                             | 293.26                    | 5.817                               | 6.604                                 | 5.283                                 | 8.280             |
| 0        | 18,092.8            | 3.99                             | 391.01                    | 6.833                               | 7.315                                 | 6.147                                 |                   |
| 1        | 18,092.8            | 3.99                             | 391.01                    | 7.112                               | 7.620                                 | 6.706                                 |                   |
| 2        | 18,092.8            | 3.99                             | 391.01                    | 7.696                               | 8.230                                 | 7.061                                 |                   |
| 3        | 18,092.8            | 3.99                             | 391.01                    | 7.925                               | 8.458                                 | 7.239                                 |                   |
| 4        | 18,092.8            | 3.99                             | 391.01                    | 7.595                               | 8.026                                 | 6.883                                 |                   |
| 5        | 18,092.8            | 3.99                             | 391.01                    | 7.544                               | 8.001                                 | 6.858                                 |                   |
| 6        | 18,092.8            | 3.99                             | 391.01                    | 7.620                               | 8.128                                 | 7.112                                 |                   |
| 7        | 18,092.8            | 3.99                             | 391.01                    | 8.128                               | 8.636                                 | 7.442                                 |                   |
| 8        | 18,092.8            | 3.99                             | 391.01                    | 8.255                               | 8.763                                 | 7.569                                 |                   |
| 9        | 18,092.8            | 3.99                             | 391.01                    | 8.357                               | 8.865                                 | 7.620                                 |                   |
| 10       | 18,092.8            | 3.99                             | 391.01                    | 8.357                               | 8.865                                 | 7.620                                 |                   |

Fecha:  
15 de Abril de 2011

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Pruebas y Ensayos

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TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-2

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

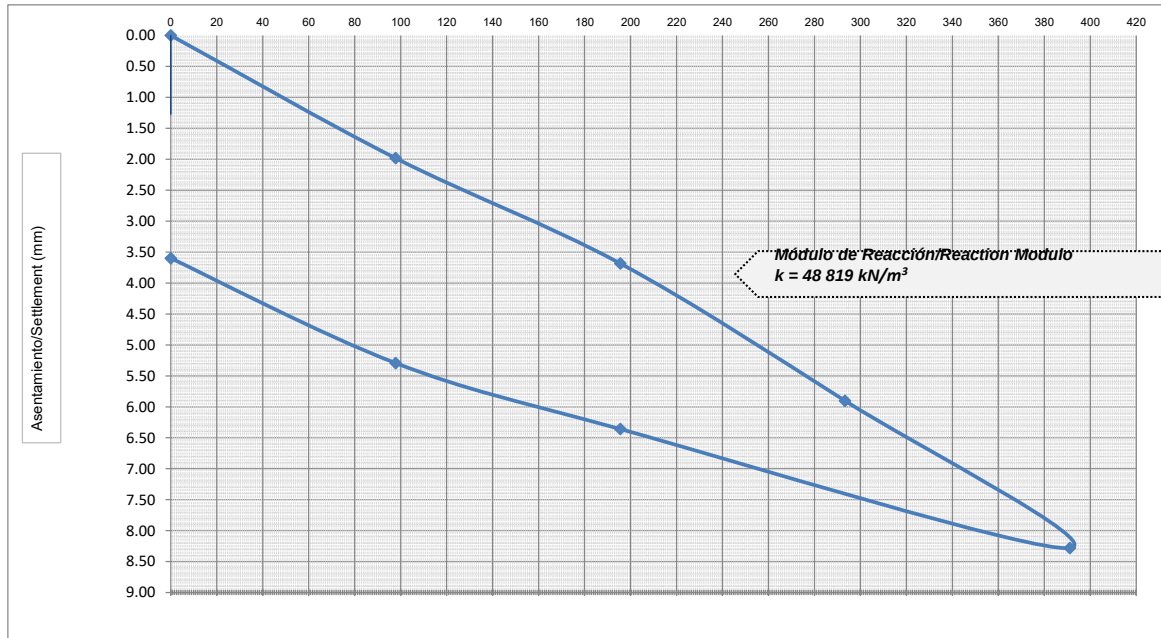
DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

| T<br>min | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE<br>(Kg/cm <sup>2</sup> ) | ESFUERZO/ STRESS<br>(kPa) | VALORES DE DEFORMACION/STRAIN VALUE |                                       |                                       | DEFORMACION<br>mm |
|----------|---------------------|-----------------------------------------------|---------------------------|-------------------------------------|---------------------------------------|---------------------------------------|-------------------|
|          |                     |                                               |                           | Deformimetro/<br>Gauge 1<br>mm      | Deformimetro/<br>Strain Gauge 2<br>mm | Deformimetro/<br>Strain Gauge 3<br>mm |                   |
| 0        | 9,046.4             | 1.99                                          | 195.50                    | 7.569                               | 6.350                                 | 5.334                                 | 6.358             |
| 1        | 9,046.4             | 1.99                                          | 195.50                    | 7.518                               | 6.299                                 | 5.258                                 |                   |
| 2        | 9,046.4             | 1.99                                          | 195.50                    | 7.518                               | 6.299                                 | 5.258                                 |                   |
| 0        | 4,523.2             | 1.00                                          | 97.75                     | 7.087                               | 6.299                                 | 5.029                                 | 5.292             |
| 1        | 4,523.2             | 1.00                                          | 97.75                     | 7.010                               | 6.248                                 | 5.004                                 |                   |
| 2        | 4,523.2             | 1.00                                          | 97.75                     | 6.528                               | 5.436                                 | 4.572                                 |                   |
| 3        | 4,523.2             | 1.00                                          | 97.75                     | 6.274                               | 5.156                                 | 4.293                                 |                   |
| 4        | 4,523.2             | 1.00                                          | 97.75                     | 6.198                               | 5.105                                 | 4.242                                 |                   |
| 5        | 4,523.2             | 1.00                                          | 97.75                     | 6.299                               | 5.258                                 | 4.318                                 |                   |
| 0        | 0.0                 | 0.00                                          | 0.00                      | 5.461                               | 3.886                                 | 1.905                                 | 3.598             |
| 1        | 0.0                 | 0.00                                          | 0.00                      | 5.334                               | 3.886                                 | 1.905                                 |                   |
| 2        | 0.0                 | 0.00                                          | 0.00                      | 5.207                               | 3.810                                 | 1.778                                 |                   |
| 3        | 0.0                 | 0.00                                          | 0.00                      | 5.207                               | 3.810                                 | 1.778                                 |                   |

PRUEBA FINALIZADA

GRAFICO DE ASENTAMIENTO VS PRESION/SETTLEMENT VS PRESSURE CHART



OBSERVACIONES/REMARKS: Las lecturas de deformación, los valores suben y bajan hasta estabilizarse

ENSAYADO POR/TESTED BY: E. Peralta  
REVISADO POR/REVIEWED BY: L. Navarro

COMPILADO POR/COMPILED BY: L. Navarro

Fecha:  
15 de Abril de 2011

Área:  
Pruebas y Ensayos

Versión:  
0

Página:  
1 de 2

TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-3

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

| T  | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE<br>(Kg/cm2) | ESFUERZO/ STRESS<br>(kPa) | VALORES DE DEFORMACION/STRAIN VALUE |              |                                       | DEFORMACION |
|----|---------------------|----------------------------------|---------------------------|-------------------------------------|--------------|---------------------------------------|-------------|
|    |                     |                                  |                           | Deformímetro/<br>Gauge 1<br>mm      | Strain<br>mm | Deformímetro/<br>Strain Gauge 2<br>mm |             |
| 0  | 3,618.6             | 0.80                             | 78.20                     | 0.508                               | 0.483        | 0.483                                 | 0.559       |
| 1  | 3,618.6             | 0.80                             | 78.20                     | 0.559                               | 0.559        | 0.559                                 |             |
| 2  | 3,618.6             | 0.80                             | 78.20                     | 0.559                               | 0.559        | 0.559                                 |             |
| 3  | 3,618.6             | 0.80                             | 78.20                     | 0.559                               | 0.559        | 0.559                                 |             |
| 0  | 7,237.1             | 1.60                             | 156.40                    | 2.286                               | 1.905        | 1.753                                 | 2.235       |
| 1  | 7,237.1             | 1.60                             | 156.40                    | 2.413                               | 2.032        | 1.854                                 |             |
| 2  | 7,237.1             | 1.60                             | 156.40                    | 2.464                               | 2.083        | 1.905                                 |             |
| 3  | 7,237.1             | 1.60                             | 156.40                    | 2.540                               | 2.159        | 1.905                                 |             |
| 4  | 7,237.1             | 1.60                             | 156.40                    | 2.565                               | 2.159        | 1.981                                 |             |
| 5  | 7,237.1             | 1.60                             | 156.40                    | 2.565                               | 2.159        | 1.981                                 |             |
| 0  | 10,855.7            | 2.39                             | 234.61                    | 4.318                               | 3.429        | 2.921                                 | 4.149       |
| 1  | 10,855.7            | 2.39                             | 234.61                    | 4.572                               | 3.632        | 3.099                                 |             |
| 2  | 10,855.7            | 2.39                             | 234.61                    | 4.699                               | 3.734        | 3.175                                 |             |
| 3  | 10,855.7            | 2.39                             | 234.61                    | 4.775                               | 3.810        | 3.277                                 |             |
| 4  | 10,855.7            | 2.39                             | 234.61                    | 4.851                               | 3.861        | 3.302                                 |             |
| 5  | 10,855.7            | 2.39                             | 234.61                    | 4.902                               | 3.937        | 3.353                                 |             |
| 6  | 10,855.7            | 2.39                             | 234.61                    | 4.953                               | 3.988        | 3.378                                 |             |
| 7  | 10,855.7            | 2.39                             | 234.61                    | 5.004                               | 4.013        | 3.429                                 |             |
| 8  | 10,855.7            | 2.39                             | 234.61                    | 5.004                               | 4.013        | 3.429                                 |             |
| 0  | 14,474.2            | 3.19                             | 312.81                    | 7.112                               | 5.461        | 4.369                                 | 6.248       |
| 1  | 14,474.2            | 3.19                             | 312.81                    | 7.493                               | 5.740        | 4.521                                 |             |
| 2  | 14,474.2            | 3.19                             | 312.81                    | 7.595                               | 5.842        | 4.648                                 |             |
| 3  | 14,474.2            | 3.19                             | 312.81                    | 7.747                               | 5.969        | 4.699                                 |             |
| 4  | 14,474.2            | 3.19                             | 312.81                    | 7.849                               | 6.045        | 4.826                                 |             |
| 5  | 14,474.2            | 3.19                             | 312.81                    | 7.874                               | 6.045        | 4.826                                 |             |
| 0  | 18,092.8            | 3.99                             | 391.01                    | 10.160                              | 7.874        | 5.639                                 | 9.068       |
| 1  | 18,092.8            | 3.99                             | 391.01                    | 10.719                              | 8.382        | 5.842                                 |             |
| 2  | 18,092.8            | 3.99                             | 391.01                    | 10.922                              | 8.585        | 6.045                                 |             |
| 3  | 18,092.8            | 3.99                             | 391.01                    | 11.125                              | 8.738        | 6.096                                 |             |
| 4  | 18,092.8            | 3.99                             | 391.01                    | 11.252                              | 8.865        | 6.172                                 |             |
| 5  | 18,092.8            | 3.99                             | 391.01                    | 11.303                              | 8.865        | 6.172                                 |             |
| 6  | 18,092.8            | 3.99                             | 391.01                    | 11.328                              | 8.941        | 6.223                                 |             |
| 7  | 18,092.8            | 3.99                             | 391.01                    | 11.430                              | 9.017        | 6.299                                 |             |
| 8  | 18,092.8            | 3.99                             | 391.01                    | 11.557                              | 9.119        | 6.401                                 |             |
| 9  | 18,092.8            | 3.99                             | 391.01                    | 11.582                              | 9.195        | 6.426                                 |             |
| 10 | 18,092.8            | 3.99                             | 391.01                    | 11.582                              | 9.195        | 6.426                                 |             |



TECNILAB, S. A.  
UNA EMPRESA E. BARRANCO Y ASOC. S. A.  
LABORATORIO DE SUELOS Y MATERIALES

FUNDADA  
EN  
1972

PRUEBA DE PLACA NO REPETITIVA/

STATIC PLATE LOAD (ASTM D 1196)

NONREPETITIVE

F-092

Fecha:  
15 de Abril de 2011

Área:  
Pruebas y Ensayos

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0

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1 de 2

TRABAJO No./JOB No.: 2-1259 CLIENTE/CLIENT: SFERA PROPERTIES CORP

LOCALIZACION/LOCATION: CAVAROSA

CAPA/MUESTRA/LAYER/SAMPLE: -- ESPESOR/THICKNESS: --- DESCRIPCIÓN/DESCRIPTION: --

PRUEBA No./TEST No.: PP-3

FECHA/DATE: 27-feb-24 HORA INICIO/START TIME: -- HORA FINAL/END TIME: --

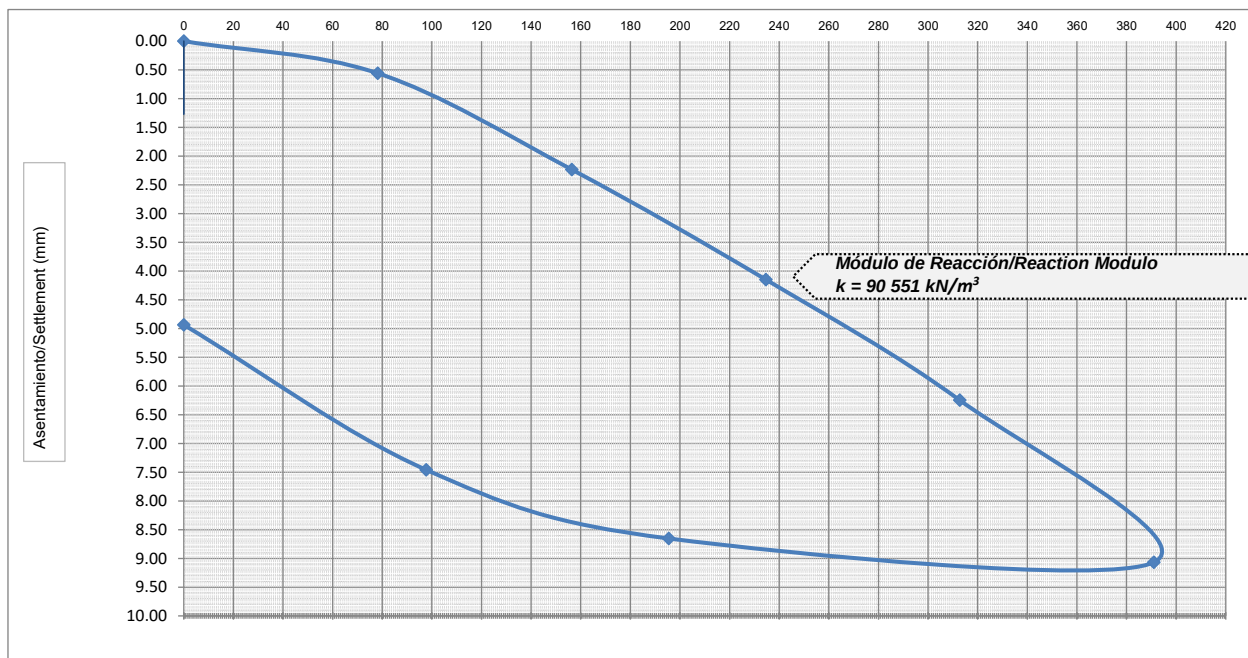
DIAMETRO DE LA PLACA/DIAMETER OF THE PLATE 30 pulg 76 cm

AREA/AREA 706.86 pulg<sup>2</sup> 4536.47 cm<sup>2</sup>

|                   |                     |                      |                  | VALORES DE DEFORMACION/STRAIN VALUE |        |                                 |                                 |             |
|-------------------|---------------------|----------------------|------------------|-------------------------------------|--------|---------------------------------|---------------------------------|-------------|
| T                 | CARGA/<br>LOAD (kg) | PRESION/<br>PRESSURE | ESFUERZO/ STRESS | Deformímetro/<br>Gauge 1            | Strain | Deformímetro/<br>Strain Gauge 2 | Deformímetro/<br>Strain Gauge 3 | DEFORMACION |
| min               |                     | (Kg/cm2)             | (kPa)            | mm                                  |        | mm                              | mm                              | mm          |
| 0                 | 9,046.4             | 1.99                 | 195.50           | 10.795                              |        | 8.560                           | 6.121                           | 8.653       |
| 1                 | 9,046.4             | 1.99                 | 195.50           | 10.668                              |        | 8.509                           | 6.096                           |             |
| 2                 | 9,046.4             | 1.99                 | 195.50           | 10.668                              |        | 9.195                           | 6.096                           |             |
| 3                 | 9,046.4             | 1.99                 | 195.50           | 10.668                              |        | 9.195                           | 6.096                           |             |
| 0                 | 4,523.2             | 1.00                 | 97.75            | 9.627                               |        | 7.747                           | 5.537                           | 7.459       |
| 1                 | 4,523.2             | 1.00                 | 97.75            | 9.449                               |        | 7.645                           | 5.461                           |             |
| 2                 | 4,523.2             | 1.00                 | 97.75            | 9.398                               |        | 7.620                           | 5.359                           |             |
| 3                 | 4,523.2             | 1.00                 | 97.75            | 9.398                               |        | 7.620                           | 5.359                           |             |
| 0                 | 0.0                 | 0.00                 | 0.00             | 6.731                               |        | 5.207                           | 3.607                           | 4.936       |
| 1                 | 0.0                 | 0.00                 | 0.00             | 6.477                               |        | 5.055                           | 0.457                           |             |
| 2                 | 0.0                 | 0.00                 | 0.00             | 6.401                               |        | 4.978                           | 3.429                           |             |
| 3                 | 0.0                 | 0.00                 | 0.00             | 6.401                               |        | 4.978                           | 3.429                           |             |
| PRUEBA FINALIZADA |                     |                      |                  |                                     |        |                                 |                                 |             |

PRUEBA FINALIZADA

GRAFICO DE ASENTAMIENTO VS PRESION/SETTLEMENT VS PRESSURE CHART



OBSERVACIONES/REMARKS:

ENSAYADO POR/TESTED BY: E. Peralta

COMPILADO POR/COMPILED BY: L. Navarro

REVISADO POR/REVIEWED BY: L. Navarro



**APENDICE O**  
**FOTOGRAFIAS**

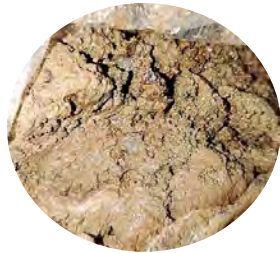
**TECNILAB, S. A.**

PROYECTO: CAVAROSA  
**INVESTIGACIÓN GEOTÉCNICA**  
TRABAJO N° 2-1259 MARZO, 2024



CONDICIÓN DEL SITIO AL MOMENTO DE REALIZAR LAS PERFORACIONES

RELLENO  
HETEROGÉNEO



ARENA  
LIMOSA



LIMO  
ARENOSO



LIMO  
ELÁSTICO



ROCA  
METEORIZADA



ROCA SANA



ESTRATIGRAFIA TÍPICA DEL SITIO