

المسيد المهندس / رئيس قطاع التنفيذ والمناطق

تحية طيبة.. وبعد،،

بالإحالة إلى مشروع القطار الكهربائي فائق السرعة ( برج العرب - العلمين ) ( القطاع الخامس ب )

نشرف بأن نرفق لسيادتكم طيه المقايسة المعدلة بعد المفاوضة بتاريخ 2023-12-18

للقطاع الآتي:

مستلم	اسم الشركة	بداية القطاع ( كم )	نهاية القطاع ( كم )	المقايسة	القيمة المالية
1	المكتب الدولي الحديث للمقاولات العامة	366+000	367+000	إتجاه فوكة	8056600 مليون جنيه

برجاء من سيادتكم التفضل بالأحاطة والتوجيه بالازم

وتفضلوا بقبول فائق الاحترام والتقدير،،،

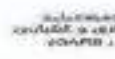


رئيس الإدارة المركزية

المنطقة الخامسة- غرب الدلتا

عميد مهندس /  
٨١١٨

"هاني محمد محمود طه"



مشروع القطار الكهربائي ذائق السرعة (أطام - الجليل)

المقاييس المعدلة بعد المناقشة بتاريخ 2023-12-18 لبنود الأعمال تلتزم مكتب العدل الهندسي للمقاولات العامة لإيجاد في 25  
القطاع من المخططة 366+000 إلى 367+000

رقم البند	بيان الأعمال	الوحدة	الكمية	الحالة	الإجمالي
1	اصلي الحفر				
1-1	بالحفر المكعب اصلي حفر باستخدام المعدات الميكانيكية لجميع أنواع التربة عدا التربة الصخرية و تسوية السطح بالأت التوسية والرش بالعماء الاصوي للوصول إلى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول إلى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ومحمل على البند تحميل ونقل التربة الزائدة لمسافة 500 متر من محور الطريق ويتم التخليط طبقا للمناسيب التصميمية والطبقات العرضية والرسومات التفصيلية المعتمدة والبند يجمع مشتتات طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف.	3م			
	- علوة 1.1 جنيه / كم لسفلة نقل ناتج الحفر				
	السعر خلال شهر مايو طبقا للمناقشة بتاريخ 2023-12-18	3م	6653.4	23.60	157,020.24
	السعر خلال شهر مايو طبقا للمناقشة بتاريخ 2023-12-18	3م	12000.0	26.50	318,000.00
2-1	بالحفر المكعب اصلي حفر باستخدام المعدات الميكانيكية في التربة المتناسقة عدا التربة الصخرية (بالطام البشوري) وتسوية السطح بالأت التوسية والرش بالعماء الاصوي للوصول إلى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول إلى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ومحمل على البند تحميل ونقل التربة الزائدة لمسافة 500 متر من محور الطريق ويتم التخليط طبقا للمناسيب التصميمية والطبقات العرضية والرسومات التفصيلية المعتمدة والبند يجمع مشتتات طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف.	3م	13087.6066	30.5	399,172
	وفي حالة زيادة مسافة نقل ناتج الحفر عن 500 متر من محور الطريق يتم حساب 0.8 جنيه لكل متر زيادة				
3	أعمال الردم				
1-3	بالحفر المكعب اصلي حفر باستخدام المعدات الميكانيكية في التربة المتناسقة عدا التربة الصخرية (بالطام البشوري) وتسوية السطح بالأت التوسية والرش بالعماء الاصوي للوصول إلى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول إلى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ومحمل على البند تحميل ونقل التربة الزائدة لمسافة 500 متر من محور الطريق ويتم التخليط طبقا للمناسيب التصميمية والطبقات العرضية والرسومات التفصيلية المعتمدة والبند يجمع مشتتات طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف.	3م			
	- في حالة طلب جهاز الإشراف زيادة نسبة الدمك عن 95% بحسب زيادة 1 جنيه على زيادة نسبة الدمك لكل 1%				
	- مسافة النقل على 2 كم و يتم احتساب علوة 1.5 جنيه لكل متر بزيادة				
	السعر خلال شهر مايو طبقا للمناقشة بتاريخ 2023-12-18	3م	4500	101.4	456,300
	علوة مسافة نقل للتربة 120 كم = 1.5*118 = 177	3م	3600	177	637,200
	علوة مسافة نقل للرمل 71 كم = 1.5*69 = 103.5	3م	900	103.5	93,150
	علوة تحصيل رسوم الكارثة والموازين طبقا للائحة لشركة الوطنية	3م	4500	13	58,500
5	طبقات الاسفلت				
1-5	بالحفر المكعب اصلي حفر باستخدام المعدات الميكانيكية في التربة المتناسقة عدا التربة الصخرية (بالطام البشوري) وتسوية السطح بالأت التوسية والرش بالعماء الاصوي للوصول إلى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول إلى أقصى كثافة جافة (95% من الكثافة الجافة القصوى) ومحمل على البند تحميل ونقل التربة الزائدة لمسافة 500 متر من محور الطريق ويتم التخليط طبقا للمناسيب التصميمية والطبقات العرضية والرسومات التفصيلية المعتمدة والبند يجمع مشتتات طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف.	3م			
	- مسافة النقل على 20 كم				
	- يتم احتساب علوة 1.3 جنيه لكل 1 كم بزيادة أو النقصان				
	السعر خلال شهر أبريل طبقا للمناقشة بتاريخ 2023-12-18	3م	617.40	144.9	89,461.26
	السعر خلال شهر مايو طبقا للمناقشة بتاريخ 2023-12-18	3م	331.20	146.4	48,487.68
	أهمية المعالجة التعجيرية	3م	948.60	161	152,724.60
	علوة مسافة النقل 119 كم = 1.3*99 = 128.7	3م	948.60	128.7	122,084.82
	علوة تحصيل رسوم الكارثة والموازين طبقا للائحة لشركة الوطنية	3م	948.60	25	23,715.00

مدير عام مشروعات الهيئة

مدير المشروع الهيئة

مدير المشروع المقاول

مدير المشروع المقاول

م/محمد حسني فياض

م/مارجريت مجدي زاهر

مدير المشروع المقاول

مكتب مساند

م/وليد صلاح

المكتب الإداري الحديث

للمقاولات العامة والتوريدات

حسب ١٩٩٢٥ لسنة ٥٩٩٠٠٢٠٠٣٦٠



المطابقة المعدلة بعد المطابقة بتاريخ 2023-12-18 لينود الأعمال تلبية مكتب العدل، الحديث للمقاولات العامة (تجارة فوكية  
القطاع من المحطة 366+000 إلى 367+000

مكتبة عرب الملك  
القاهرة - مصر مطروح  
" هاني محمد محمود علي "








 (ସାଧାରଣ)  
 ମୂଲ୍ୟ ଟି 6 ଟଙ୍କା  
 1972 ମସିହା

الجمهورية العربية السورية  
مجلس الوزراء  
الوزارة العامة  
القطاع العام  
القطاع الخاص  
القطاع الزراعي  
القطاع الصناعي  
القطاع التجاري  
القطاع الثقافي  
القطاع الرياضي  
القطاع الاجتماعي  
القطاع الصحي  
القطاع التعليمي  
القطاع العلمي  
القطاع الفني  
القطاع الحرفي  
القطاع الفكري  
القطاع الفني  
القطاع الحرفي  
القطاع الفكري

الجمهورية العربية السورية  
مجلس الوزراء  
الوزارة العامة  
القطاع العام  
القطاع الخاص  
القطاع الزراعي  
القطاع الصناعي  
القطاع التجاري  
القطاع الثقافي  
القطاع الرياضي  
القطاع الاجتماعي  
القطاع الصحي  
القطاع التعليمي  
القطاع العلمي  
القطاع الفني  
القطاع الحرفي  
القطاع الفكري



م / طارق حجازي  
مدير  
SPECTRIUM CONSULTING

6450.4	القطاع الخاص (م)						
6450.4	القطاع العام (م)						
6015.0	20.05	300	366+300	366+000	18/4/2024	IR (54)	<p>القطاع الخاص (م)</p> <p>القطاع العام (م)</p> <p>القطاع الزراعي (م)</p> <p>القطاع الصناعي (م)</p> <p>القطاع التجاري (م)</p> <p>القطاع الثقافي (م)</p> <p>القطاع الرياضي (م)</p> <p>القطاع الاجتماعي (م)</p> <p>القطاع الصحي (م)</p> <p>القطاع التعليمي (م)</p> <p>القطاع العلمي (م)</p> <p>القطاع الفني (م)</p> <p>القطاع الحرفي (م)</p> <p>القطاع الفكري (م)</p>
435.4	3.11	140	366+320 6+860	366+180 6+720	11/8/2023	IR (53)	
القطاع	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع
6450.4	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع
6450.4	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع	القطاع

القطاع الخاص (م)

القطاع العام (م)

القطاع الزراعي (م)

القطاع الصناعي (م)

القطاع التجاري (م)

القطاع الثقافي (م)

القطاع الرياضي (م)

القطاع الاجتماعي (م)

القطاع الصحي (م)

القطاع التعليمي (م)

القطاع العلمي (م)

القطاع الفني (م)

القطاع الحرفي (م)

القطاع الفكري (م)





ملف رقم: ١٢٣٤٥٦٧٨٩  
تاريخ: ٢٠٢٣/١٠/١٥  
ZAX  
مدير: محمد أحمد

Handwritten notes on a tilted piece of paper:

الطريق  
والنقطة  
 $\text{CT} = 2 \times 0.7$   
المساحة  
المجموع  
المجموع

3		4500	كردية القياسية	الرمز	الاسم	رقم الحساب	البيان
3	4500	كردية القياسية	[رمز]	الرمز	الاسم	رقم الحساب	البيان
							3
							4500
							كردية القياسية
							3
							4500
							كردية القياسية
							3
							4500
							كردية القياسية

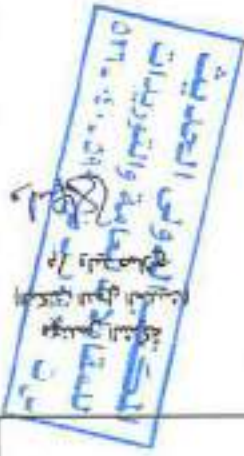
(အိန္ဒိယနိုင်ငံတော် အစိုးရ၏ ခန့်မှန်းချက်)

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( ୫୪୪ )  
 ॥ ୩ ॥ ୩ ॥ ୩ ॥  
 ॥ ୩ ॥ ୩ ॥ ୩ ॥



مهندس الاستشارات  
/ د /



3600							(د) الكسب الكلي	
280	0.80	2.50	140	366+140	366+000	2/5/2024	IR47-REV1	زيادة نسبة زيادة في حصة ملكية من 99% إلى 100% زيادة نسبة الملكية
280	0.80	2.50	140	366+140	366+000	30/4/2024	IR46-REV1	المستقبل
280	0.80	2.50	140	366+140	366+000	28/4/2024	IR45-REV1	المستقبل
280	0.80	2.50	140	366+140	366+000	25/4/2024	IR44-REV1	المستقبل
280	0.80	2.50	140	366+140	366+000	23/4/2024	IR43-REV1	المستقبل
280	0.80	2.50	140	366+140	366+000	21/4/2024	IR41-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	2/5/2024	IR36-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	30/4/2024	IR20-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	28/4/2024	IR17-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	25/4/2024	IR15-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	23/4/2024	IR14-REV1	المستقبل
320	0.80	2.50	160	366+300	366+140	21/4/2024	IR12-REV1	المستقبل
الكسب	نسبة الزيادة (متر)	مساحة المساحة (متر)	الارتفاع	الارتفاع	الارتفاع	الارتفاع	الارتفاع	الارتفاع
								الارتفاع
3600.00	3600.00	3600.00	3600.00	3600.00	3600.00	3600.00	3600.00	3600.00

المستقبل : الكسب الكلي : 3600.00

(م) مساحة الأرض (120 كم)

المستقبل : الكسب الكلي : 3600.00

المستقبل : الكسب الكلي : 3600.00

المستقبل : الكسب الكلي : 3600.00

المستقبل : الكسب الكلي : 3600.00

المستقبل : الكسب الكلي : 3600.00



[illegible]

מחנה : מחנה ארבעה ימים

(5.16)  $\text{C}_2\text{H}_5\text{Br} + \text{C}_2\text{H}_5\text{MgBr} \rightarrow \text{C}_4\text{H}_{10}$

\* የወጣት ስጦታ ለጥቅም ሲውል ማስታወሻ

1.5 و 2.5 کے درمیان کے تمام اعداد پر مشتمل ایک حلقہ -

• የፍትሕ ማህበረ ተቋማት በጥቅምት 2017 ዓ.ም. 56% ደረጃ ላይ ሲሆን የፍትሕ ማህበረ ተቋማት በጥቅምት 2018 ዓ.ም. 33% ደረጃ ላይ ሲሆን

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החברה נמצאת במצב של פירוק, והנכס נמכר במחיר של 50% מהערך המיועד. המכירה נעשתה במסגרת תהליך פירוק, והנכס נמכר במחיר של 50% מהערך המיועד. המכירה נעשתה במסגרת תהליך פירוק, והנכס נמכר במחיר של 50% מהערך המיועד.

15. *Chlorophyll a*

2. 2017-18 2018-19 2019-20 2020-21 2021-22 2022-23 2023-24 2024-25 2025-26 2026-27 2027-28 2028-29 2029-30 2030-31 2031-32 2032-33 2033-34 2034-35 2035-36 2036-37 2037-38 2038-39 2039-40 2040-41 2041-42 2042-43 2043-44 2044-45 2045-46 2046-47 2047-48 2048-49 2049-50 2050-51 2051-52 2052-53 2053-54 2054-55 2055-56 2056-57 2057-58 2058-59 2059-60 2060-61 2061-62 2062-63 2063-64 2064-65 2065-66 2066-67 2067-68 2068-69 2069-70 2070-71 2071-72 2072-73 2073-74 2074-75 2075-76 2076-77 2077-78 2078-79 2079-80 2080-81 2081-82 2082-83 2083-84 2084-85 2085-86 2086-87 2087-88 2088-89 2089-90 2090-91 2091-92 2092-93 2093-94 2094-95 2095-96 2096-97 2097-98 2098-99 2099-00 2100-01 2101-02 2102-03 2103-04 2104-05 2105-06 2106-07 2107-08 2108-09 2109-10 2110-11 2111-12 2112-13 2113-14 2114-15 2115-16 2116-17 2117-18 2118-19 2119-20 2120-21 2121-22 2122-23 2123-24 2124-25 2125-26 2126-27 2127-28 2128-29 2129-30 2130-31 2131-32 2132-33 2133-34 2134-35 2135-36 2136-37 2137-38 2138-39 2139-40 2140-41 2141-42 2142-43 2143-44 2144-45 2145-46 2146-47 2147-48 2148-49 2149-50 2150-51 2151-52 2152-53 2153-54 2154-55 2155-56 2156-57 2157-58 2158-59 2159-60 2160-61 2161-62 2162-63 2163-64 2164-65 2165-66 2166-67 2167-68 2168-69 2169-70 2170-71 2171-72 2172-73 2173-74 2174-75 2175-76 2176-77 2177-78 2178-79 2179-80 2180-81 2181-82 2182-83 2183-84 2184-85 2185-86 2186-87 2187-88 2188-89 2189-90 2190-91 2191-92 2192-93 2193-94 2194-95 2195-96 2196-97 2197-98 2198-99 2199-00 2200-01 2201-02 2202-03 2203-04 2204-05 2205-06 2206-07 2207-08 2208-09 2209-10 2210-11 2211-12 2212-13 2213-14 2214-15 2215-16 2216-17 2217-18 2218-19 2219-20 2220-21 2221-22 2222-23 2223-24 2224-25 2225-26 2226-27 2227-28 2228-29 2229-30 2230-31 2231-32 2232-33 2233-34 2234-35 2235-36 2236-37 2237-38 2238-39 2239-40 2240-41 2241-42 2242-43 2243-44 2244-45 2245-46 2246-47 2247-48 2248-49 2249-50 2250-51 2251-52 2252-53 2253-54 2254-55 2255-56 2256-57 2257-58 2258-59 2259-60 2260-61 2261-62 2262-63 2263-64 2264-65 2265-66 2266-67 2267-68 2268-69 2269-70 2270-71 2271-72 2272-73 2273-74 2274-75 2275-76 2276-77 2277-78 2278-79 2279-80 2280-81 2281-82 2282-83 2283-84 2284-85 2285-86 2286-87 2287-88 2288-89 2289-90 2290-91 2291-92 2292-93 2293-94 2294-95 2295-96 2296-97 2297-98 2298-99 2299-00 2300-01 2301-02 2302-03 2303-04 2304-05 2305-06 2306-07 2307-08 2308-09 2309-10 2310-11 2311-12 2312-13 2313-14 2314-15 2315-16 2316-17 2317-18 2318-19 2319-20 2320-21 2321-22 2322-23 2323-24 2324-25 2325-26 2326-27 2327-28 2328-29 2329-30 2330-31 2331-32 2332-33 2333-34 2334-35 2335-36 2336-37 2337-38 2338-39 2339-40 2340-41 2341-42 2342-43 2343-44 2344-45 2345-46 2346-47 2347-48 2348-49 2349-50 2350-51 2351-52 2352-53 2353-54 2354-55 2355-56 2356-57 2357-58 2358-59 2359-60 2360-61 2361-62 2362-63 2363-64 2364-65 2365-66 2366-67 2367-68 2368-69 2369-70 2370-71 2371-72 2372-73 2373-74 2374-75 2375-76 2376-77 2377-78 2378-79 2379-80 2380-81 2381-82 2382-83 2383-84 2384-85 2385-86 2386-87 2387-88 2388-89 2389-90 2390-91 2391-92 2392-93 2393-94 2394-95 2395-96 2396-97 2397-98 2398-99 2399-00 2400-01 2401-02 2402-03 2403-04 2404-05 2405-06 2406-07 2407-08 2408-09 2409-10 2410-11 2411-12 2412-13 2413-14 2414-15 2415-16 2416-17 2417-18 2418-19 2419-20 2420-21 2421-22 2422-23 2423-24 2424-25 2425-26 2426-27 2427-28 2428-29 2429-30 2430-31 2431-32 2432-33 2433-34 2434-35 2435-36 2436-37 2437-38 2438-39 2439-40 2440-41 2441-42 2442-43 2443-44 2444-45 2445-46 2446-47 2447-48 2448-49 2449-50 2450-51 2451-52 2452-53 2453-54 2454-55 2455-56 2456-57 2457-58 2458-59 2459-60 2460-61 2461-62 2462-63 2463-64 2464-65 2465-66 2466-67 2467-68 2468-69 2469-70 2470-71 2471-72 2472-73 2473-74 2474-75 2475-76 2476-77 2477-78 2478-79 2479-80 2480-81 2481-82 2482-83 2483-84 2484-85 2485-86 2486-87 2487-88 2488-89 2489-90 2490-91 2491-92 2492-93 2493-94 2494-95 2495-96 2496-97 2497-98 2498-99 2499-00 2500-01 2501-02 2502-03 2503-04 2504-05 2505-06 2506-07 2507-08 2508-09 2509-10 2510-11 2511-12 2512-13 2513-14 2514-15 2515-16 2516-17 2517-18 2518-19 2519-20 2520-21 2521-22 2522-23 2523-24 2524-25 2525-26 2526-27 2527-28 252



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مجلس المدينة  
الرياض - ٢٠٢٣



رقم		2411.10		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند		مستند	
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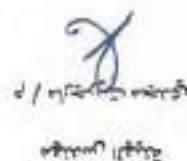
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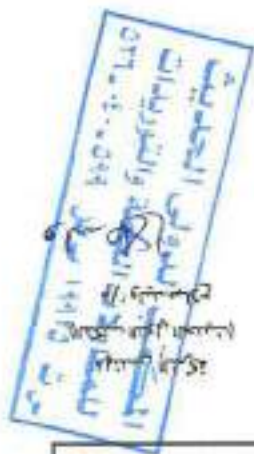


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 (G.O.)  
 No. 1234  
 Dated: 12/12/2023



مدير عام  
مدير عام

948.6		إجمالي الكميات (م)					
رقم	الكمية	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)
322	2.3	140	6+80	366+140	6+540	366+000	10/4/2023
295.4	2.11	140	6+80	366+140	6+540	366+000	15/4/2023
92.00	2.3	40	6+720	366+180	366+140	6+680	17/8/2023
84.4	2.11	40	6+720	366+180	366+140	6+680	21/8/2023
99.60	0.83	120	6+840	366+300	6+720	366+180	28/8/2023
55.2	0.46	120	6+840	366+300	6+720	366+180	20/8/2023
IR(D-SG-6)							
IR(D-SG-5)							
IR(D-SG-4)							
IR(D-SG-3)							
IR(D-SG-2)							
IR(D-SG-1)							
الكمية	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)
2411.10	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)	الكمية (متر)

ملاحظات: 1- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.

ملاحظات: 2- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.

ملاحظات: 3- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.

ملاحظات: 4- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.

ملاحظات: 5- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.

ملاحظات: 6- الكميات المذكورة في الجدول هي الكميات المقدرة فقط.







مشروع القطار السريع  
الخط الأول  
محطة /  
K2  
الخط الأول

*(Handwritten notes in Urdu script)*

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( ॥ ॐ नमो भगवते वासुदेवाय ॥ )

2015年12月20日 星期一 12:20:00

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- 1. The first line is a heading or title, possibly "The first line is a heading or title".
- 2. The second line is a sub-heading or section, possibly "The second line is a sub-heading or section".
- 3. The third line is a paragraph of text, possibly "The third line is a paragraph of text".
- 4. The fourth line is a paragraph of text, possibly "The fourth line is a paragraph of text".
- 5. The fifth line is a paragraph of text, possibly "The fifth line is a paragraph of text".
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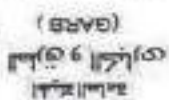






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مشروع القطار الكهربائي  
2002  
التمويل

*(Handwritten note in Arabic script)*

البيانات المالية المجمعة (م) (البيانات المالية المجمعة)										4944.60	
موجودات صافية										824.10	
إجمالي										4120.50	
رقم	اسم المادة	كمية	القيمة	القيمة	القيمة	القيمة	القيمة	القيمة	القيمة	القيمة	القيمة
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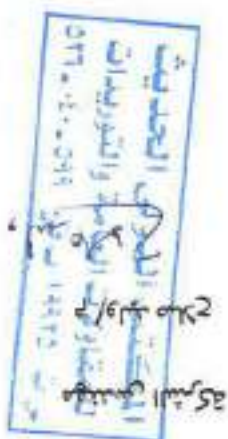
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[illegible][illegible]

(2) 6/9/07







مدير مشروع الهيئة  
م/مارجريت مجدي زانير

المساحة						7563.20
عرض						8.08
طول						140
الارتفاع ( متر )						16.08
الموقع الكائينوي						367+000
من						366+600
التاريخ						21/1/2023
طلب التصميم						IR_40
اجمالي الكميات خلال فترة المستخلص الحالية (2م)						1131.20
اجمالي الكميات خلال فترة المستخلص الحالية (2م)						7563.20
اجمالي الكمي الكلي (2م)						7563.20

كمية المقايضة

2م 19320

تخطيط : الدولي الحديث للمطارات العامة

رقم البند و بنائه : ( 3-11 ) توريد وتركيب طبقة من السطح الصخري جيتو جريد

مشروع : القطار الكهربائي السريع (العين السخنة - العاصمة الإدارية - العين - مطروح) قطاع طريق النيل في المسافة من الكم

قائمة الكميات الواردة بالمستخلص جاري (2)



الهيئة العامة  
للطرق و الكباري  
(GARB)



20121117.6: صورة المقابلة  
20121117.60 : صورة المقابلة


 ( 8887 )  
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# MATERIAL INSPECTION REQUEST



الهيئة العامة  
للطرق و  
النقل  
(ERTBA)



الجمعية المصرية  
لمهندسي  
الطرق و  
النقل  
(ERTBA)



Contractor Company	EL DAWLY ELHADETH		Designer Company	K.K. Engineering Consulting Office	
Issued by Contractor	Name	Eng. Saleh	Date/Serial Number	11/10/2023 (P.L.T. 1)	
Received by GARB CONSULTANT	Eng. Sayed Saif	Khalaf Zaki	MR	2:00 PM	
CODE-1	Station Reference	31 to 32	Work Activity	Depot Reference	
	Sub Element of Activity	01 to 03		Ep XXX Note For Kilometer point only Start Km is used	

Description of Materials	Middle Embankment (-1.5 from forma level)		
Location to be Used	From	336+200	TO 336+420
MAR & UIR Approval No	UIR (F-55)	Date	11/10/2023
Supplier Name	M.A.R.(QT-4)		4/10/2023
Test Requirement	EL SEWY	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (EG21-41.2) VERSION 2 BY GVECON GROUP
Reference Photos	F.L.T.(DIN 18134)	Other	
	No/Yes		
Item	Description	Unit	Quantity
1	PLATE LOAD TEST	NUMBER	2
2			
3			
4			
Comments by: (K.K.)		Comments by: Eng. Alaa Abd-Allatif (ER)	
1-The PLATE LOAD Test Result P.L.T. by third party lab ( Egypt-Japan University Of Science And Tecnology) is Approved.		1-P.L.T was carried- out by third party lab ( Egypt-Japan University Of Science And Tecnology) . 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	Saleh		A
QA/QC *	Eng. Sayed Saif	Khalaf Zaki		A
GARB **	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	for [Signature]	17-10-2023	Awc

\* Designer

\*\* Alignment/Bridges: Coven only



## Technical Report

### Plate Loading Tests

KM 336+220 to 336+320 and KM 336+320 to 336+420

(Middle Embankment (-1.5 m))

### Project

Electric Express Train (Sokhna - New capital - 6th  
of October city - New Elalamein city)

Prepared for

ELDAWLY ELHADETH Company

Sinai, Egypt

(October 16, 2023)



يتمتع  
أمين عام الجامعة  
ليواء مهندس / أسامة شمس







## 1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by ELDAWLY ELHADETH Company to conduct two plate loading tests on the Middle Embankment (-1.5 m) of the Electric Express Train project at two locations (KM 336+220 to 336+320 and KM 336+320 to 336+420) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Saleh Mohamed of ELDAWLY ELHADETH Company. Field team members (Mr. Ahmed Sabry) from the working CETCU team visited the project site on October 16, 2023 and performed the required tests. This report summarizes the plate loading test procedure according to DIN18134, the test results and their interpretations, and the CETCU pertaining recommendations.

## 2. Test Set Up and Instrumentation

- The German standard DIN18134 was applied to define the test setup including the loading system, test conditions, and procedure for the plate loading tests.
- The tests were carried out to determine the Strain Moduli (Ev1 and Ev2) and their ratio (Ev2/Ev1) from a stress – deformation relationship of two consecutive loading from Loading-Unloading-Loading regime.
- The loading plate has a diameter of 600 mm and a thickness of 25 mm and it is provided with equally spaced stiffeners. The upper plate face is parallel to the bottom face of the plate to allow a 300-mm plate to be placed on the 600-mm plate top.
- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which can apply and release the load increments.
- The dial gauge used to measure the plate settlement has a resolution of 0.01 mm and the lever ratio was equal to 1.
- The temperature at the time of the test was  $27 \pm 1^\circ\text{C}$ .
- The plate was carried out on a Middle Embankment (-1.5 m) (according to the company) at two points (KM 336+220 to 336+320 and KM 336+320 to 336+420). The test surface area was levelled, and the plate was bedded on this surface.
- The hydraulic jack was placed on the middle of, and normal to, the loading plate beneath the reaction loading system and secured against tilting.
- The reaction loading system was a heavy-duty purpose Loader CAT 966G.



EJUST CETCU Unit





### 3. Test Procedure and Results

The plate load test was conducted in accordance with the DIN18134. Loading, unloading, and reloading regimes were considered to estimate the resilient modulus of the tested soil. Prior to the test, the force transducer and dial gauge were reset to zero, and then a load corresponding to a stress of 0.01 MN/m<sup>2</sup> was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m<sup>2</sup> was reached, and the loading increment was 0.025 MN/m<sup>2</sup>. The load was gradually released in four stages. Following unloading, a second loading cycle was performed, but the load was only increased to the penultimate stage of the first cycle. Two plate loading tests on the Middle Embankment (-1.5 m) of the Electric Express Train project were conducted at two locations (KM 336+220 to 336+320 and KM 336+320 to 336+420) and the data collected at the two test points is included in Appendix A.

Table 1 presents the load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+220 to 336+320), while Table 2 shows the data obtained at the second loading stage.

**Table 1: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+220 to 336+320)**

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.10
2	14.14	0.050	0.20
3	21.21	0.075	0.34
4	28.28	0.100	0.50
5	35.35	0.125	0.70
6	42.42	0.150	0.85
7	49.49	0.175	0.93
8	56.56	0.200	1.05
9	63.63	0.225	1.19
10	70.7	0.250	1.35
11	56.56	0.200	1.35
12	49.49	0.175	1.35
13	35.35	0.125	1.17
14	21.21	0.075	1.00
15	1.414	0.005	0.40





Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+220 to 336+320)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.40
1	7.07	0.025	0.54
2	14.14	0.050	0.64
3	21.21	0.075	0.75
4	28.28	0.100	0.82
5	35.35	0.125	0.91
6	42.42	0.150	1.01
7	49.49	0.175	1.12
8	56.56	0.200	1.20
9	63.63	0.225	1.29

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 336+220 to 336+320) are shown in Figure 1. Table 3 shows the calculations of the resilient modulus of the tested soil according to DIN18134. The testing data corresponding to the second testing point (KM 336+320 to 336+420) is provided in Tables 4-6 and Figure 2.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+220 to 336+320)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	-0.08	0.41
$a_1$ (mm/(MN/m <sup>2</sup> ))	6.28	4.51
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-2.43	-2.73
$E_v = 1.5 \text{ rf } (a_1 + a_2 \cdot s_{0,max})$	79.24	117.39
$E_{v2}/E_{v1}$	1.48	



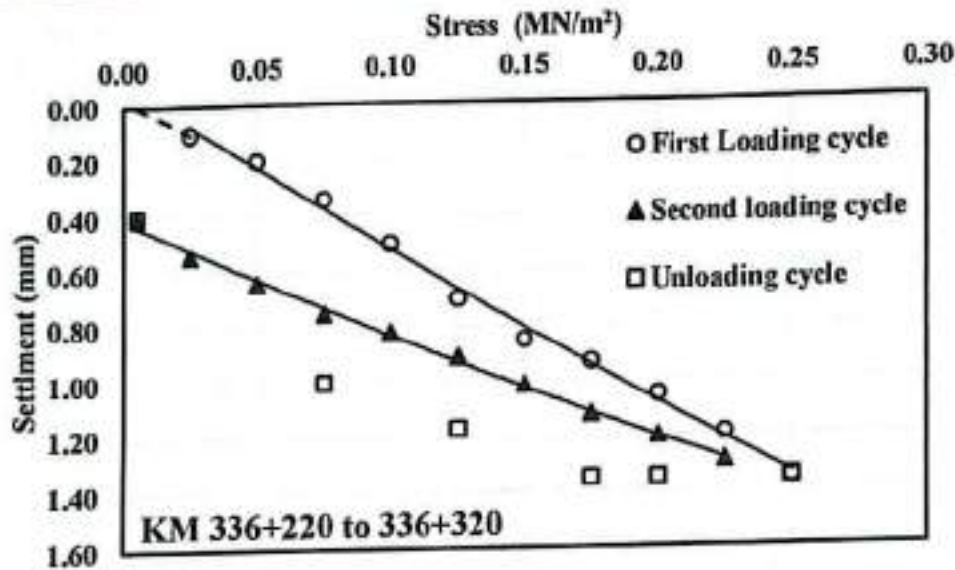


Figure 1: Load-settlement data: plate loading test performed at (KM 336+220 to 336+320)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+320 to 336+420)

Loading stage	Load (F) kN	Normal stress ( $\sigma_0$ ) MN/m <sup>2</sup>	Settlement (S) mm
0	1.414	0.005	0.00
1	7.07	0.025	0.25
2	14.14	0.050	0.35
3	21.21	0.075	0.52
4	28.28	0.100	0.80
5	35.35	0.125	0.95
6	42.42	0.150	1.10
7	49.49	0.175	1.27
8	56.56	0.200	1.37
9	63.63	0.225	1.52
10	70.7	0.250	1.66
11	56.56	0.200	1.66
12	49.49	0.175	1.66
13	35.35	0.125	1.48
14	21.21	0.075	1.30
15	1.414	0.005	0.76

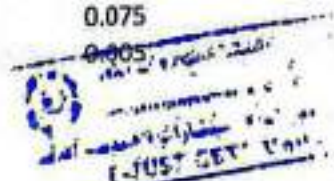






Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+320 to 336+420)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.76
1	7.07	0.025	0.86
2	14.14	0.050	1.00
3	21.21	0.075	1.13
4	28.28	0.100	1.25
5	35.35	0.125	1.40
6	42.42	0.150	1.50
7	49.49	0.175	1.58
8	56.56	0.200	1.62
9	63.63	0.225	1.69

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+320 to 336+420)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.00	0.71
$a_1$ (mm/(MN/m <sup>2</sup> ))	8.31	6.62
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-6.67	-9.85
$E_v = 1.5 \text{ rf } (a_1 + a_2 \cdot s_{0,max})$	67.79	108.29
$E_{v2}/E_{v1}$	1.60	

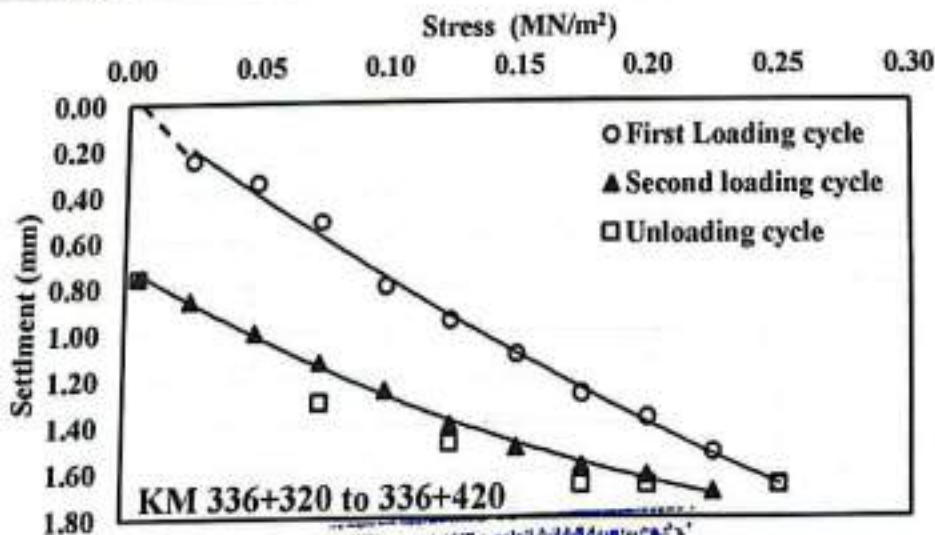


Figure 2: Load-settlement data: plate loading test performed at (KM 336+320 to 336+420)



#### 4. Closure

Test results presented herein report the load-settlement data obtained from two plate loading tests conducted on the Middle Embankment (-1.5 m) of the Electric Express train project at two locations (KM 336+220 to 336+320 and KM 336+320 to 336+420) in accordance with German Standard, DIN18134.

Location	$E_{v1}$ MN/m <sup>2</sup>	$E_{v2}$ MN/m <sup>2</sup>	$E_{v2}/E_{v1}$ ratio
KM 336+220 to 336+320	79.24	117.39	1.48
KM 336+320 to 336+420	67.79	108.29	1.60

\* Note: Before interpreting these test results for future applications, the Middle Embankment (-1.5 m) in-situ variability between the testing locations should be considered.

Technical committee

Prof. Dr. Mohamed F. M. Fahmy

Lab Engineer

Mohamed A. Al-Najjar

مجلس استشارات واختبارات  
I-JUST CETC Unit



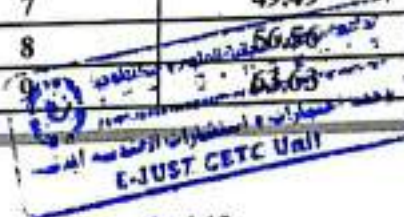
# Appendix A





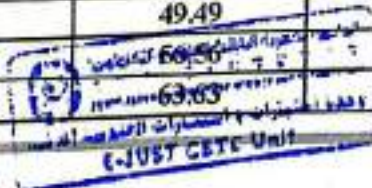


Location of test site:	KM 336+220 to 336+320		Field team	Mr.Ahmed Sabry
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	16/10/2023
Diameter of loading plate	600		Time	10:47:00 AM 11:15:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Middle Embankment (-1.5 m)			
Bedding material	---			
Temperature	27°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.90	
	2	14.14	9.80	
	3	21.21	9.66	
	4	28.28	9.50	
	5	35.35	9.30	
	6	42.42	9.15	
	7	49.49	9.07	
	8	56.56	8.95	
	9	63.63	8.81	
	10	70.7	8.65	
Unloading Stage	11	56.56	8.65	
	12	49.49	8.65	
	13	35.35	8.83	
	14	21.21	9.00	
	15	1.414	9.60	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.60	
	1	7.07	9.46	
	2	14.14	9.36	
	3	21.21	9.25	
	4	28.28	9.18	
	5	35.35	9.09	
	6	42.42	8.99	
	7	49.49	8.88	
	8	56.56	8.80	
	9	63.63	8.71	



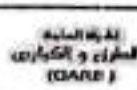


Location of test site:	KM 336+320 to 336+420		Field team	Mr.Ahmed Sabry
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	16/10/2023
Diameter of loading plate	600		Time	10:15:00 AM
				10:42:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Middle Embankment (-1.5 m)			
Bedding material	---			
Temperature	27°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.75	
	2	14.14	9.65	
	3	21.21	9.48	
	4	28.28	9.20	
	5	35.35	9.05	
	6	42.42	8.90	
	7	49.49	8.73	
	8	56.56	8.63	
	9	63.63	8.48	
	10	70.7	8.34	
Unloading Stage	11	56.56	8.34	
	12	49.49	8.34	
	13	35.35	8.52	
	14	21.21	8.70	
	15	1.414	9.24	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.24	
	1	7.07	9.14	
	2	14.14	9.00	
	3	21.21	8.87	
	4	28.28	8.75	
	5	35.35	8.60	
	6	42.42	8.50	
	7	49.49	8.42	
	8	56.56	8.38	
	9	63.63	8.31	





# MATERIAL INSPECTION REQUEST



Contractor Company		EL DAWLY ELHADETH		Designer Company		(LX) Engineering Consulting Office	
Issued by Contractor	Name	Eng. Saleh	Sign	Date/Serial Number		Time	
				05/08/2023		2:00 PM	
Received by GARU CONSULTANT	Eng. Sayed Saif	Eng. Hammam	MIR	C1	C2	C3	DO
				338	EW	CS	6
				MM	YY	DD	MM
				8	23	2	0

code:1	S1 to S21	D1 to S3	Kp XXX Note
code:2	Station Reference	Depot Reference	For Kilometer point only Start Km is used
code:3	Work Activity		
	Sub Element of Activity		

Description of Materials		Bed Excavation			
Location to be Used		From	336+200	TO	336+420
MAR & UIR Approval No	UIR C-2	Date		01/08/2023	
	M.A.R. QT-Bed excavation-1			01/08/2023	
Supplier Name	ELORUBA				
Test Requirement	P.L.T.(DIN 18134)	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (C021-41.2) VERSION 2 BY CMECON GROUP		
Reference Photos	No/Yes	Other			
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD TEST	NUMBER	2	06/08/2023	
2					
3					
4					
Comments by: (K.K)		Comments by: Eng. Alaa Abd-Allatif (ER)			
1-The PLATE LOAD Test Result P.L.T. by third party lab ( egypt-Japan University Of Science And Tecnology) is Approved.		1-P.L.T was carried- out by third party lab ( egypt-Japan University Of Science And Tecnology) . 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.			

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	Saleh		A
QA/QC *	Eng. Sayed Saif	Ferhamam		A
GARB**	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	Alaa	7-8-2023	Awc

\* Designer

\*\* Alignment/Bridges: Culvert only





# Technical Report

## Plate Loading Tests

KM 336+200 to 336+300 and KM 336+300 to 336+420

Native Soil

## Project

Electric Express Train (Sokhna - New capital - 6th  
of October city - New Elalamein city)

Prepared for

ELDAWLY ELHADETH Company

Sinai, Egypt

(August 6, 2023)



بجسمه  
امين عام الجامعة  
لواء مهندس / أسامة فتحي





## 1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by ELDAWLY ELHADETH Company to conduct two plate loading tests on the Native Soil of the Electric Express Train project at two locations (KM 336+200 to 336+300 and KM 336+300 to 336+420) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Saleh Mohamed of ELDAWLY ELHADETH Company. Field team members (Sameh Hassan) from the working CETCU team visited the project site on August 6, 2023 and performed the required tests. This report summarizes the plate loading test procedure according to DIN18134, the test results and their interpretations, and the CETCU pertaining recommendations.

## 2. Test Set Up and Instrumentation

- The German standard DIN18134 was applied to define the test setup including the loading system, test conditions, and procedure for the plate loading tests.
- The tests were carried out to determine the Strain Moduli (Ev1 and Ev2) and their ratio (Ev2/Ev1) from a stress – deformation relationship of two consecutive loading from Loading-Unloading-Loading regime.
- The loading plate has a diameter of 600 mm and a thickness of 25 mm and it is provided with equally spaced stiffeners. The upper plate face is parallel to the bottom face of the plate to allow a 300-mm plate to be placed on the 600-mm plate top.
- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which can apply and release the load increments.
- The dial gauge used to measure the plate settlement has a resolution of 0.01 mm and the lever ratio was equal to 1.
- The temperature at the time of the test was  $33 \pm 1^\circ\text{C}$ .
- The plate was carried out on a Native Soil (according to the company) at two points (KM 336+200 to 336+300 and KM 336+300 to 336+420). The test surface area was levelled, and the plate was bedded on this surface.
- The hydraulic jack was placed on the middle of, and normal to, the loading plate beneath the reaction loading system and secured against tilting.
- The reaction loading system was a heavy multi-purpose loader CAT 966G.





### 3. Test Procedure and Results

The plate load test was conducted in accordance with the DIN18134. Loading, unloading, and reloading regimes were considered to estimate the resilient modulus of the tested soil. Prior to the test, the force transducer and dial gauge were reset to zero, and then a load corresponding to a stress of 0.01 MN/m<sup>2</sup> was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m<sup>2</sup> was reached, and the loading increment was 0.025 MN/m<sup>2</sup>. The load was gradually released in four stages. Following unloading, a second loading cycle was performed, but the load was only increased to the penultimate stage of the first cycle. Two plate loading tests on the Native Soil of the Electric Express Train project were conducted at two locations (KM 336+200 to 336+300 and KM 336+300 to 336+420) and the data collected at the two test points is included in Appendix A.

Table 1 presents the load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+200 to 336+300), while Table 2 shows the data obtained at the second loading stage.

**Table 1: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+200 to 336+300)**

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.45
2	14.14	0.050	0.56
3	21.21	0.075	0.82
4	28.28	0.100	0.99
5	35.35	0.125	1.27
6	42.42	0.150	1.55
7	49.49	0.175	2.08
8	56.56	0.200	2.38
9	63.63	0.225	2.50
10	70.7	0.250	2.65
11	56.56	0.200	2.58
12	49.49	0.175	2.50
13	35.35	0.125	2.19
14	21.21	0.075	1.99
15	1.414	0.005	0.79





Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+200 to 336+300)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.79
1	7.07	0.025	1.23
2	14.14	0.050	1.40
3	21.21	0.075	1.58
4	28.28	0.100	1.79
5	35.35	0.125	1.95
6	42.42	0.150	2.12
7	49.49	0.175	2.27
8	56.56	0.200	2.42
9	63.63	0.225	2.52

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 336+200 to 336+300) are shown in Figure 1. Table 3 shows the calculations of the resilient modulus of the tested soil according to DIN18134. The testing data corresponding to the second testing point (KM 336+300 to 336+420) is provided in Tables 4-6 and Figure 2.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+200 to 336+300)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.12	0.84
$a_1$ (mm/(MN/m <sup>2</sup> ))	9.13	11.22
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	6.24	-17.03
$E_v = 1.5 r / (a_1 + a_2 \cdot s_{0,MAX})$	42.10	64.59
$E_{v2}/E_{v1}$	1.53	



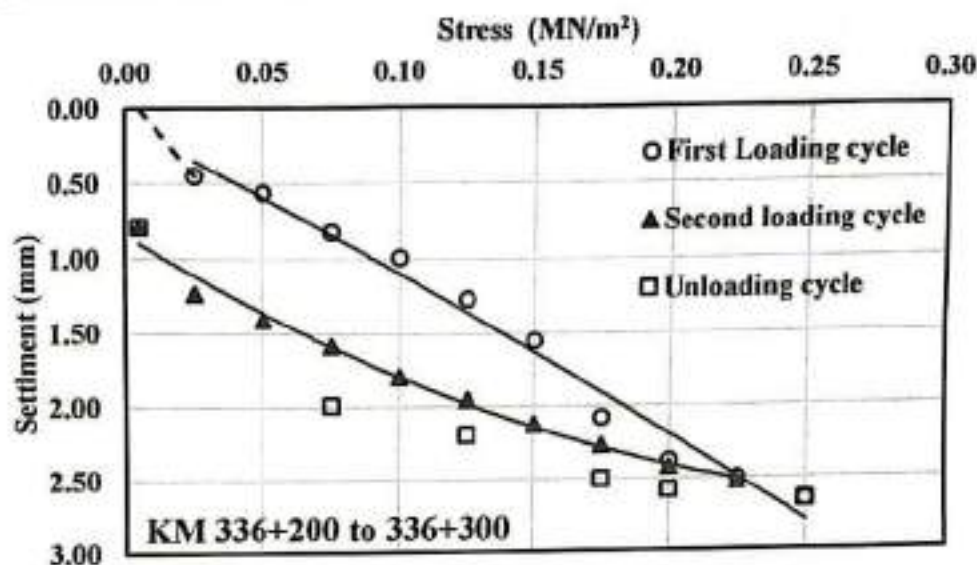


Figure 1: Load-settlement data: plate loading test performed at (KM 336+200 to 336+300)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+300 to 336+420)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.49
2	14.14	0.050	0.58
3	21.21	0.075	0.77
4	28.28	0.100	0.90
5	35.35	0.125	1.05
6	42.42	0.150	1.21
7	49.49	0.175	1.37
8	56.56	0.200	1.50
9	63.63	0.225	1.66
10	70.7	0.250	1.77
11	56.56	0.200	1.69
12	49.49	0.175	1.62
13	35.35	0.125	1.47
14	21.21	0.075	1.29
15	1.414	0.005	0.34

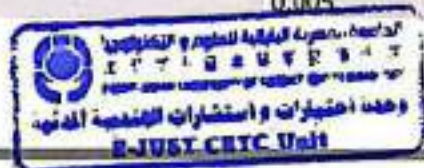






Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+300 to 336+420)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.34
1	7.07	0.025	0.75
2	14.14	0.050	0.89
3	21.21	0.075	1.00
4	28.28	0.100	1.15
5	35.35	0.125	1.27
6	42.42	0.150	1.40
7	49.49	0.175	1.51
8	56.56	0.200	1.60
9	63.63	0.225	1.66

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+300 to 336+420)

Parameters	1st loading cycle	2nd loading cycle
$(s_{0, \max})$ MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.31	0.41
$a_1$ (mm/(MN/m <sup>2</sup> ))	6.03	9.24
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-0.49	-16.69
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0, \max})$	76.22	88.82
$Ev_2 / Ev_1$	1.17	

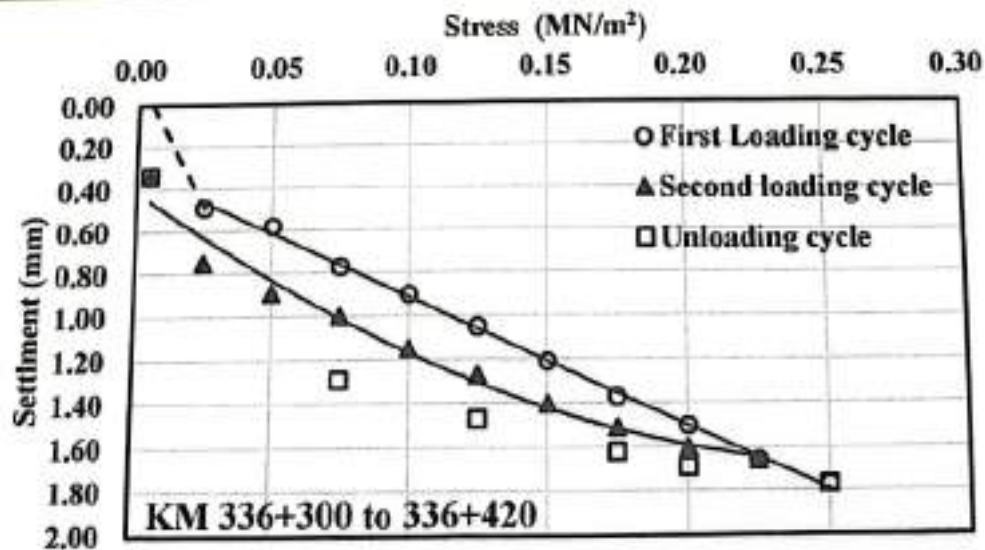


Figure 2: Load-settlement data: plate loading test performed at (KM 336+300 to 336+420)





#### 4. Closure

Test results presented herein report the load-settlement data obtained from two plate loading tests conducted on the Native Soil of the Electric Express train project at two locations (KM 336+200 to 336+300 and KM 336+300 to 336+420) in accordance with German Standard, DIN18134.

Location	$E_{v1}$ MN/m <sup>2</sup>	$E_{v2}$ MN/m <sup>2</sup>	$E_{v2}/E_{v1}$ ratio
KM 336+200 to 336+300	42.10	64.59	1.53
KM 336+300 to 336+420	76.22	88.82	1.17

• Note: Before interpreting these test results for future applications, the Native Soil in-situ variability between the testing locations should be considered.

#### Technical committee

Dr. Mahmoud Ahmed

Prof. Dr. Mohamed F. M. Fahmy



#### Lab Engineer

Mohamed A. Al-Najjar



## Appendix A





Location of test site:	KM 336+200 to 336+300		Field team	Samah Hassan
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	6/8/2023
Diameter of loading plate	600		Time	10:50:00 AM 11:17:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Native Soil			
Bedding material	---			
Temperature	33°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.55	
	2	14.14	9.44	
	3	21.21	9.18	
	4	28.28	9.01	
	5	35.35	8.73	
	6	42.42	8.45	
	7	49.49	7.92	
	8	56.56	7.62	
	9	63.63	7.50	
	10	70.7	7.35	
Unloading Stage	11	56.56	7.42	
	12	49.49	7.50	
	13	35.35	7.81	
	14	21.21	8.01	
	15	1.414	9.21	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.21	
	1	7.07	8.77	
	2	14.14	8.60	
	3	21.21	8.42	
	4	28.28	8.21	
	5	35.35	8.05	
	6	42.42	7.88	
	7	49.49	7.73	
	8	56.56	7.58	
	9	63.63	7.48	





Location of test site:	KM 336+300 to 336+420		Field team	Sameh Hassan
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	6/8/2023
Diameter of loading plate	600		Time	11:22:00 AM 11:49:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Native Soil			
Bedding material	---			
Temperature	33°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.51	
	2	14.14	9.42	
	3	21.21	9.23	
	4	28.28	9.10	
	5	35.35	8.95	
	6	42.42	8.79	
	7	49.49	8.63	
	8	56.56	8.50	
	9	63.63	8.34	
	10	70.7	8.23	
Unloading Stage	11	56.56	8.31	
	12	49.49	8.38	
	13	35.35	8.53	
	14	21.21	8.71	
	15	1.414	9.66	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.66	
	1	7.07	9.25	
	2	14.14	9.11	
	3	21.21	9.00	
	4	28.28	8.85	
	5	35.35	8.73	
	6	42.42	8.60	
	7	49.49	8.49	
	8	56.56	8.40	
	9	63.63	8.34	

# MATERIAL INSPECTION REQUEST



Contractor Company	EL DAWLY ELHADETH		Designer Company	(K.K.) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Saleh	<i>Saleh</i>	31/10/2023	2:00 PM							
			(P.L.T-3)								
Received by GARU CONSULTANT	Eng. Sayed Salf	<i>Khaled Zakri</i>	MIR	C1	C2	C3	DD	MM	YY	HH	MM
				335	EW	C5	1	11	23	2	0

CODE - 1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE - 2	Work Activity		
CODE - 3	Sub Element of Activity		

Description of Materials	Middle Embankment (-1.5 from forma level )			
Location to be Used	From	335+920	TO	336+200
MAR & UIR Approval No	UIR (F-60)	Date	29/10/2023	
	M.A.R. QT (6)		22/10/2023	
Supplier Name	EL SEWY			
Test Requirement	P.L.T(DIN 18134)	Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CNECON GROUP	
Reference Photos	No/Yes	Other		

Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD TEST	NUMBER	3	2/11/2023	
2					
3					
4					

Comments by: (K.K.)	Comments by: Eng. Alaa Abd-Allatif (ER)
1-The PLATE LOAD Test Result P.L.T. by third party lab ( egypt-japan University Of Science And Tecnology) is Approved.	1-P.L.T was carried- out by third party lab ( egypt-japan University Of Science And Tecnology) . 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	<i>Saleh</i>		A
QA/QC*	Eng. Sayed Salf	<i>Khaled Zakri</i>		A
GARB**	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa Abd-Allatif</i>	2-11-2023	Awe

\* Designer  
\*\* Alignment/Bridges: Consultant only



## Technical Report

### Plate Loading Tests

KM 336+100 to 336+200, KM 336+000 to 336+100,  
and KM 335+900 to 336+000

(Middle Embankment (-1.5 m))

### Project

**Electric Express Train (Sokhna - New capital - 6th  
of October city - New Elalamein city)**

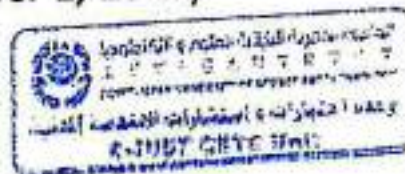
Prepared for

**ELDAWLY ELHADETH Company**

Sinai, Egypt

(November 1, 2023)

إستعداد ٢٠٢٣  
أمين عام الجامعة  
لواء مهندس / أسامة فتحي





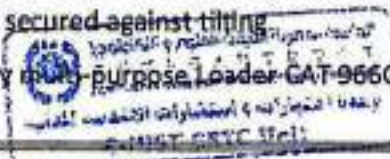


## 1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by ELDAWLY ELHADETH Company to conduct 3 plate loading tests on the Middle Embankment (-1.5 m) of the Electric Express Train project at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Saleh Mohamed of ELDAWLY ELHADETH Company. Field team members (Sameh Hassan) from the working CETCU team visited the project site on November 1, 2023 and performed the required tests. This report summarizes the plate loading test procedure according to DIN18134, the test results and their interpretations, and the CETCU pertaining recommendations.

## 2. Test Set Up and Instrumentation

- The German standard DIN18134 was applied to define the test setup including the loading system, test conditions, and procedure for the plate loading tests.
- The tests were carried out to determine the Strain Moduli ( $E_{v1}$  and  $E_{v2}$ ) and their ratio ( $E_{v2}/E_{v1}$ ) from a stress – deformation relationship of two consecutive loading from Loading-Unloading-Loading regime.
- The loading plate has a diameter of 600 mm and a thickness of 25 mm and it is provided with equally spaced stiffeners. The upper plate face is parallel to the bottom face of the plate to allow a 300-mm plate to be placed on the 600-mm plate top.
- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which can apply and release the load increments.
- The dial gauge used to measure the plate settlement has a resolution of 0.01 mm and the lever ratio was equal to 1.
- The temperature at the time of the test was  $27 \pm 1^\circ\text{C}$ .
- The plate was carried out on a Middle Embankment (-1.5 m) (according to the company) at 3 points (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000). The test surface area was levelled, and the plate was bedded on this surface.
- The hydraulic jack was placed on the middle of, and normal to, the loading plate beneath the reaction loading system and secured against tilting.
- The reaction loading system was a heavy-duty purpose Loader CAT-966G.





### 3. Test Procedure and Results

The plate load test was conducted in accordance with the DIN18134. Loading, unloading, and reloading regimes were considered to estimate the resilient modulus of the tested soil. Prior to the test, the force transducer and dial gauge were reset to zero, and then a load corresponding to a stress of 0.01 MN/m<sup>2</sup> was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m<sup>2</sup> was reached, and the loading increment was 0.025 MN/m<sup>2</sup>. The load was gradually released in four stages. Following unloading, a second loading cycle was performed, but the load was only increased to the penultimate stage of the first cycle. 3 plate loading tests on the Middle Embankment (-1.5 m) of the Electric Express Train project were conducted at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) and the data collected at the 3 test points is included in Appendix A.

Table 1 presents the load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200), while Table 2 shows the data obtained at the second loading stage.

**Table 1: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200)**

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.39
2	14.14	0.050	0.44
3	21.21	0.075	0.63
4	28.28	0.100	0.78
5	35.35	0.125	0.89
6	42.42	0.150	1.02
7	49.49	0.175	1.13
8	56.56	0.200	1.19
9	63.63	0.225	1.27
10	70.7	0.250	1.37
11	56.56	0.200	1.36
12	49.49	0.175	1.33
13	35.35	0.125	1.24
14	21.21	0.075	1.13
15	1.414	0.005	0.48





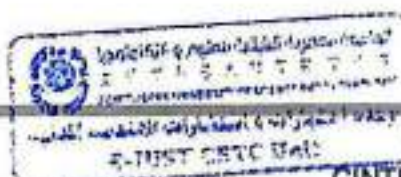
Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200)

Loading stage	Load (F) kN	Normal stress ( $\sigma_0$ ) MN/m <sup>2</sup>	Settlement (S) mm
0	1.414	0.005	0.48
1	7.07	0.025	0.64
2	14.14	0.050	0.76
3	21.21	0.075	0.86
4	28.28	0.100	0.99
5	35.35	0.125	1.08
6	42.42	0.150	1.16
7	49.49	0.175	1.25
8	56.56	0.200	1.31
9	63.63	0.225	1.35

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 336+100 to 336+200) are shown in Figure 1. Table 3 shows the calculations of the resilient modulus of the tested soil according to DIN18134. The testing data corresponding to the second testing point (KM 336+000 to 336+100) is provided in Tables 4-6 and Figure 2. The testing data corresponding to the third testing point (KM 335+900 to 336+000) is provided in Tables 7-9 and Figure 3.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+100 to 336+200)

Parameters	1st loading cycle	2nd loading cycle
$(s_{0,max})$ MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.19	0.47
$a_1$ (mm/(MN/m <sup>2</sup> ))	6.53	6.17
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-7.34	-9.93
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,max})$	95.83	122.06
$Ev_2/Ev_1$	1.27	





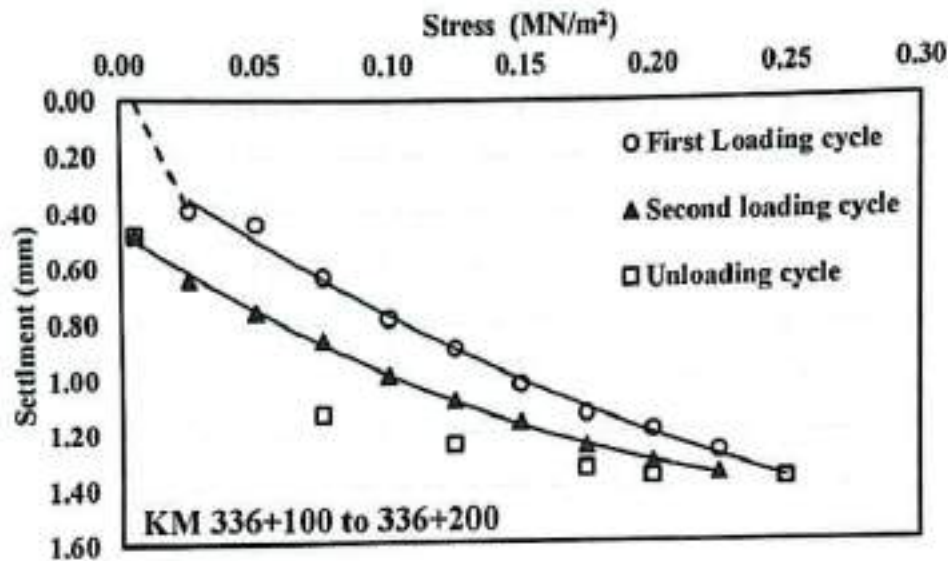


Figure 1: Load-settlement data: plate loading test performed at (KM 336+100 to 336+200)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+000 to 336+100)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.24
2	14.14	0.050	0.28
3	21.21	0.075	0.39
4	28.28	0.100	0.49
5	35.35	0.125	0.56
6	42.42	0.150	0.65
7	49.49	0.175	0.73
8	56.56	0.200	0.82
9	63.63	0.225	0.87
10	70.7	0.250	0.96
11	56.56	0.200	0.94
12	49.49	0.175	0.89
13	35.35	0.125	0.78
14	21.21	0.075	0.66
15	1.414	0.005	0.16





Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+000 to 336+100)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.16
1	7.07	0.025	0.35
2	14.14	0.050	0.43
3	21.21	0.075	0.53
4	28.28	0.100	0.60
5	35.35	0.125	0.67
6	42.42	0.150	0.73
7	49.49	0.175	0.80
8	56.56	0.200	0.87
9	63.63	0.225	0.90

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+000 to 336+100)

Parameters	1st loading cycle	2nd loading cycle
( $s_{t,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.13	0.18
$a_1$ (mm/(MN/m <sup>2</sup> ))	3.64	5.07
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-1.27	-8.48
$E_v = 1.5 r / (a_1 + a_2 \cdot s_{t,max})$	135.45	152.71
$E_{v2}/E_{v1}$	1.13	

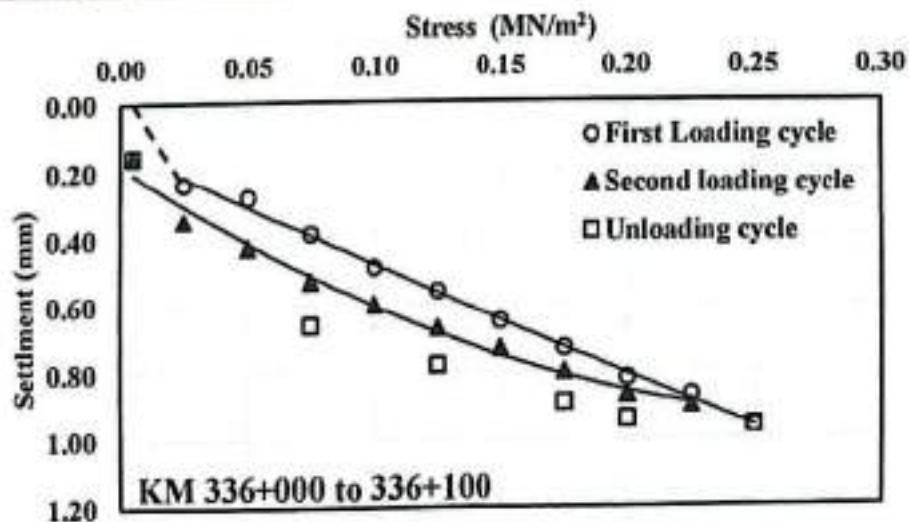


Figure 2: Load-settlement data: plate loading test performed at (KM 336+000 to 336+100)



Table 7: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 335+900 to 336+000)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.61
2	14.14	0.050	0.81
3	21.21	0.075	1.05
4	28.28	0.100	1.16
5	35.35	0.125	1.32
6	42.42	0.150	1.46
7	49.49	0.175	1.57
8	56.56	0.200	1.70
9	63.63	0.225	1.80
10	70.7	0.250	1.91
11	56.56	0.200	1.90
12	49.49	0.175	1.87
13	35.35	0.125	1.75
14	21.21	0.075	1.60
15	1.414	0.005	0.66

Table 8: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 335+900 to 336+000)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.66
1	7.07	0.025	0.87
2	14.14	0.050	0.99
3	21.21	0.075	1.04
4	28.28	0.100	1.13
5	35.35	0.125	1.26
6	42.42	0.150	1.35
7	49.49	0.175	1.43
8	56.56	0.200	1.54
9	63.63	0.225	1.57

Table 9: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 335+900 to 336+000)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.42	0.69
$a_1$ (mm/(MN/m <sup>2</sup> ))	8.50	5.42
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-10.43	-6.45
$Ev = 1.5 / (a_1 + a_2 \cdot s_{0,max})$	76.29	118.24
$Ev_2/Ev_1$		





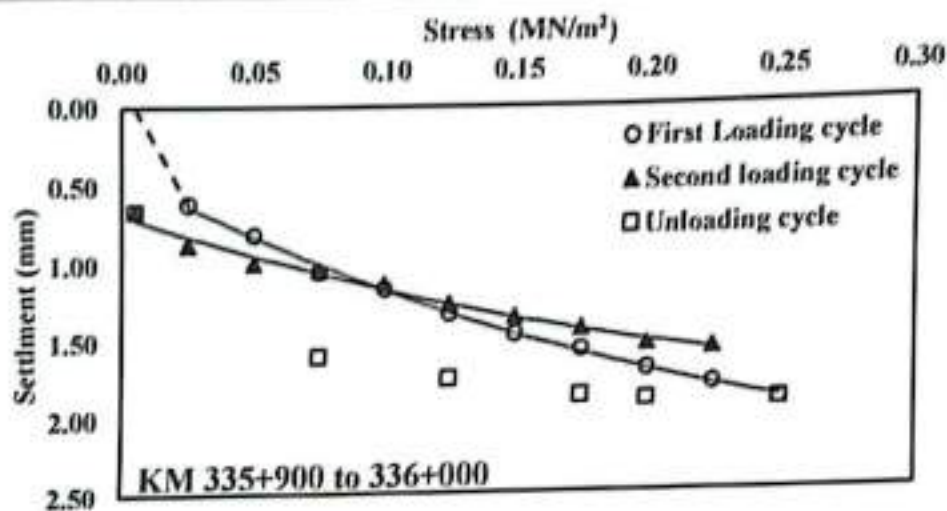
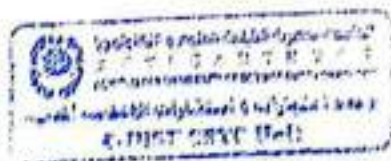


Figure 3: Load-settlement data: plate loading test performed at (KM 335+900 to 336+000)





#### 4. Closure

Test results presented herein report the load-settlement data obtained from 3 plate loading tests conducted on the Middle Embankment (-1.5 m) of the Electric Express train project at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) in accordance with German Standard, DIN18134.

Location	$E_{v1}$ MN/m <sup>2</sup>	$E_{v2}$ MN/m <sup>2</sup>	$E_{v2}/E_{v1}$ ratio
KM 336+100 to 336+200	95.83	122.06	1.27
KM 336+000 to 336+100	135.45	152.71	1.13
KM 335+900 to 336+000	76.29	118.24	1.55

- Note: Before interpreting these test results for future applications, the Middle Embankment (-1.5 m) in-situ variability between the testing locations should be considered.

#### Technical committee

Prof. Dr. Mohamed F. M. Fahmy



Lab Engineer

Mohamed A. Al-Najjar



## Appendix A







Location of test site:	KM 336+100 to 336+200		Field team	Sameh Hassan
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	1/11/2023
Diameter of loading plate	600		Time	11:20:00 AM 11:47:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Middle Embankment (-1.5 m)			
Bedding material	---			
Temperature	27°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.61	
	2	14.14	9.56	
	3	21.21	9.37	
	4	28.28	9.22	
	5	35.35	9.11	
	6	42.42	8.98	
	7	49.49	8.87	
	8	56.56	8.81	
	9	63.63	8.73	
	10	70.7	8.63	
Unloading Stage	11	56.56	8.64	
	12	49.49	8.67	
	13	35.35	8.76	
	14	21.21	8.87	
	15	1.414	9.52	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.52	
	1	7.07	9.36	
	2	14.14	9.24	
	3	21.21	9.14	
	4	28.28	9.01	
	5	35.35	8.92	
	6	42.42	8.84	
	7	49.49	8.75	
	8	56.56	8.69	
9	63.63	8.65		



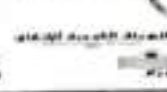
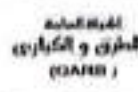
Location of test site:	KM 336+000 to 336+100		Field team	Sameh Hassan	
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	1/11/2023	
Diameter of loading plate	600		Time	11:52:00 AM 12:19:00 PM	
Lever ratio	1		Note: CAT 966G		
Type of Soil	Middle Embankment (-1.5 m)				
Bedding material	---				
Temperature	27°C				
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)		
Loading Stage	0	1.414	10.00		
	1	7.07	9.76		
	2	14.14	9.72		
	3	21.21	9.61		
	4	28.28	9.51		
	5	35.35	9.44		
	6	42.42	9.35		
	7	49.49	9.27		
	8	56.56	9.18		
	9	63.63	9.13		
Unloading Stage	10	70.7	9.04		
	11	56.56	9.06		
	12	49.49	9.11		
	13	35.35	9.22		
	14	21.21	9.34		
Test regime	Reloading Stage	15	1.414	9.84	
		0	1.414	9.84	
		1	7.07	9.65	
		2	14.14	9.57	
		3	21.21	9.47	
		4	28.28	9.40	
		5	35.35	9.33	
		6	42.42	9.27	
		7	49.49	9.20	
		8	56.56	9.13	
9	63.63	9.10			



Location of test site:	KM 335+900 to 336+000		Field team	Sameh Hassan
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	1/11/2023
Diameter of loading plate	600		Time	12:24:00 PM 12:51:00 PM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Middle Embankment (-1.5 m)			
Bedding material	---			
Temperature	27°C		Dial Gauge Reading (mm)	
Test regime	Loading Stage No.	Load (kN)		
Loading Stage	0	1.414	10.00	
	1	7.07	9.39	
	2	14.14	9.19	
	3	21.21	8.95	
	4	28.28	8.84	
	5	35.35	8.68	
	6	42.42	8.54	
	7	49.49	8.43	
	8	56.56	8.30	
	9	63.63	8.20	
	10	70.7	8.09	
Unloading Stage	11	56.56	8.10	
	12	49.49	8.13	
	13	35.35	8.25	
	14	21.21	8.40	
	15	1.414	9.34	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.34	
	1	7.07	9.13	
	2	14.14	9.01	
	3	21.21	8.96	
	4	28.28	8.87	
	5	35.35	8.74	
	6	42.42	8.65	
	7	49.49	8.57	
	8	56.56	8.46	
9	63.63	8.43		



# MATERIAL APPROVAL REQUEST



Contractor Company	EL DAWLY ELHADETH		Designer Company	(K.K) Engineering Consulting Office			
Issued by Contractor	Name	Eng. Saleh	Sign	Date/Serial Number		Time	
				17/11/2023		8:00	
				QT (24)			
Received by GARBU CONSULTANT	Eng. Khaled Zaki	Khaled Zaki	MAR	CL	C2	C3	DD
				335	EW	C5	18
							MM
							TY
							PH
							MM

CODE-1	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
	Work Activity		
	Sub Element of Activity		

Description of Materials	Fill Layer Total Quantity ( 35000 m³)		
Location to be Used	From Station 335+480 to Station 336+480		
Sample only	Yes	Materials Type	Fill layers
Supplier Name	ELSEWY	Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG23-45.2) VERSION 2 BY CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	
Comments by: (K.K)		Comments by: Eng. Alaa Abd-Allatif (ER)	
1-Quality test Result By Third Party lab CEL is Approved.		1-All tests were selected for Quality test and were carried-out by Thrid party lab CEL.	
2-This Sample Representative ( 5000 m³ ) only.		2-Results report attached and acceptable with the project specifications.	
<p>تم الاكتمال من نتائج الاختبار المطلوبة</p>		3-Final approval is subject to above mentioned comments.	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	Saleh		A
QA/QC *	Eng. Khaled Zaki	Khaled Zaki		AWC
GARB**	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	Alaa Abd-Allatif	2-12-2023	AWC

\* Designer

\*\* Alignment/Bridges/ Culvert only

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

Dear Gentleman,

Attached here with the Soil Embankment delivered on 18/11/2023

**Materials test**

1. Sieve analysis according to ASTM D-422.
2. Material finer than sieve No. 200 according to ASTM D-1140.
3. Liquid limits and plasticity index of soil according to ASTM D-4318.
4. Soil classification according to Project Specs.
5. Proctor Test according to ASTM D-1557
6. CBR according to ASTM D-1883
7. Organic Content ASTM D-2974

*Note: The sample was brought by the client to our laboratory and the laboratory is not responsible for the way it is taken*

Signature: The stamp is an oval shape with a blue border. Inside, the word 'CEL' is at the top. Below it, the text 'مكتب معامل الاستشارات الهندسية' is written in Arabic. Further down, 'الساحل الشمالي - 02' is written. At the bottom, there is a line of smaller Arabic text: 'شركة توفيق المارزوقه - القليوبه - الجيزة'.

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**RESULTS OF SIEVE ANALYSIS According to ASTM D-C 136**

Sieve Size (mm)	Passing %
50	100
37.5	95.4
25	91.2
19	83.1
12.50	75.1
9.50	64.8
4.75	56.7
2.36	46.7
2.00	42.5
1.18	37.4
0.600	34.6
0.425	31.5
0.300	26.4
0.150	22.4





Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Materials finer than 75  $\mu$ m (no.200) sieve  
by washing ASTM D-1140.**

Test	Results (%)
Percentage of material finer than Sieve Size 75 $\mu$ m (No.200)	13.5

Signature /  

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Results of liquid limit and plasticity index  
of soils according to ASTM D-4318**

Test	Results (%)
Liquid Limit	26.1
Plastic Limit	20.4
Plasticity Index	5.7

Signature /  

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Soil Classification According to Project Specs (Embankment)**

TEST	Results (%)	Limits according Projects Specs	
		(A-1-a)	(A-1-b)
Group Classification	(A-1-b)		
2.00 mm (No.10).	42.5	Max 50 %	-----
0.425 mm (No. 40).	31.5	Max 30 %	Max 50 %
0.075 mm (No. 200).	13.5	Max 15 %	Max 15 %
Characteristics of fraction passing 0.425 mm (No.40)			
Liquid Limit .....	26.1	-----	-----
Plasticity index .....	5.7	Max 6 %	Max 6 %

The test results are (☒ Comply - ☐ Not Comply) with specifications limits

Signature /  **CEL**  
مكتب معامل الاستشارات الهندسية  
الساحل الشمالي 02  
د. محمد توفيق - شارع الملك الأفدر - القاهرة

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Zamalek, Cairo.  
Tel.& Fax : 27367231 - 27363093

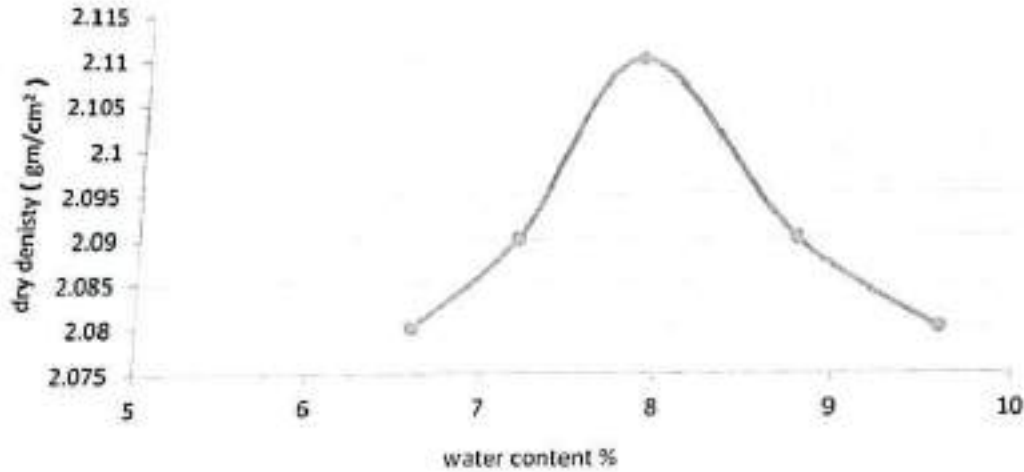


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Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Moisture – Density relation of soil**  
**Test result (Modified proctor test)**  
**ASTM D-1557**



- Max dry density (gm/cm³) : 2.11
- Optimum moisture content % : 7.9

Signature /  

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Test Results of California Bearing Ratio on Base Materials**  
**ASTM D 1883**

penetration		stress on piston (Mpa)
mm	Inch	
0.64	0.025	1.02
1.27	0.050	1.34
1.91	0.075	1.78
2.54	0.100	2.09
3.18	0.125	2.38
3.81	0.150	2.71
4.45	0.175	2.97
5.08	0.200	3.29
5.71	0.225	3.52
6.35	0.250	3.71

CBR Result	Stress (Mpa)		CBR %
At 0.1 inch (2.54 mm) penetration	St. Value	Sample results	30.3
	6.90	2.09	

**Notes :**

- 1- Attached graph shows penetration resistance versus penetration magnitude.
- 2- The sample was compacted to dry density of 2.11 (gm /cm<sup>3</sup>) at 7.9 % optimum water content.
- 3- Surcharge load 4.50 Kg.

Signature

**CEL**  
مكتب معامل الاستشارات الهندسية  
الساحل الشمالي 02

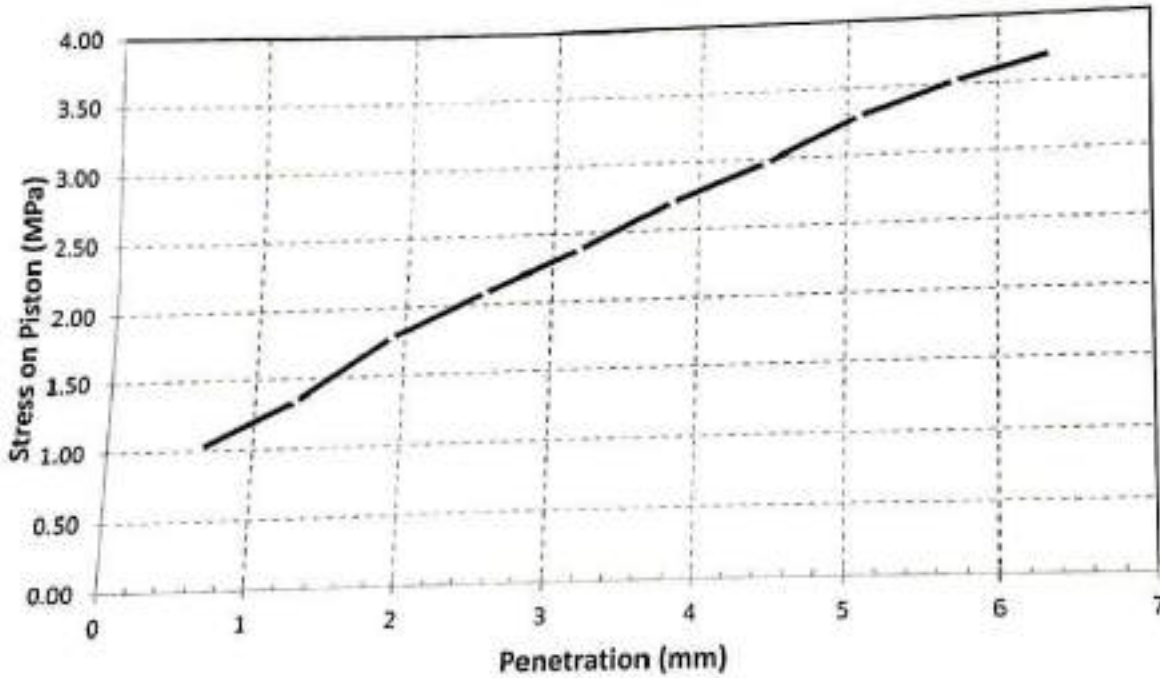
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Zamalek, Cairo.  
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Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Load Penetration Curve of CBR Test**  
**ASTM D-1883**



Signature

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الساحل الشمالي 02  
الطريق الرئيسي - شبراخيت - الأقصر - الزمالة - القاهرة



# CEL

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مكتب معامل الإستشارات الهندسية

Company  
Project  
Delivery Date  
Report Date  
Sample Id  
Report No.

المكتب الدولي الحديث للمقاولات العامة والتوريدات :  
: Electric express train.  
: 23/11/2023  
: 02/12/2023  
: soil embankment (335+480:336+500)  
: 007

**ORGANIC OF SOIL ASTM D 2974**  
**METHOD TYPE D**

Test	Results
Amount of organic Content %	NIL

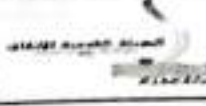
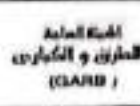


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# MATERIAL APPROVAL REQUEST



Contractor Company	EL DAWLY ELHADETH		Designer Company	(K.K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Saleh	<i>Saleh</i>	27/11/2023	8:00							
			Q1 (29)								
Received by GARB CONSULTANT	Eng. Khaled Zaki	<i>Khaled Zaki</i>	MAR	C1	C2	C3	DD	MM	YY	HH	MM
				335	EW	CS	18	11	23	8	0

Code 1	S1 to S21	D1 to S1	Sp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
	Work Activity		
	Sub Element of Activity		

Description of Materials	Fill Layer Total Quantity ( 35000 m³ )		
Location to be Used	From Station 335+480 to Station 336+480		
Sample only	Yes	Materials Type	Fill layers
Supplier Name	ELSEWY	Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (EG23-41.2) VERSION 2 BY CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	
<b>Comments by: (K.K)</b> 1-Quality test Result By Third Party lab CEL is Approved. 2-This Sample Representative ( 5000 m3 ) only. <i>تم الاتفاق على نتائج الاختبار لرضايتها</i>		<b>Comments by: Eng. Alaa Abd-Allatif (ER)</b> 1-All tests were selected for Quality test and were carried-out by Third party lab CEL . 2-Results report attached and acceptable with the project specifications. 3-Final approval is subject to above mentioned comments.	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	<i>Saleh</i>		A
QA/QC *	Eng. Khaled Zaki	<i>Khaled Zaki</i>		AWC
GARB**	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	<i>for Alaa Abd-Allatif</i>	2-12-2023	AWC

\* Designer

\*\* Alignment/Bridges: Culvert only

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

Dear Gentleman,

Attached here with the Soil Embankment delivered on 18/11/2023

### Materials test

1. Sieve analysis according to ASTM D-422.
2. Material finer than sieve No. 200 according to ASTM D-1140.
3. Liquid limits and plasticity index of soil according to ASTM D-4318.
4. Soil classification according to Project Specs.
5. Proctor Test according to ASTM D-1557
6. CBR according to ASTM D-1883
7. Organic Content ASTM D-2974

*Note: The sample was brought by the client to our laboratory and the laboratory is not responsible for the way it is taken*

Signature: 



Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**RESULTS OF SIEVE ANALYSIS According to ASTM D-C 136**

Sieve Size (mm)	Passing %
50	100
37.5	95.4
25	91.2
19	83.1
12.50	75.1
9.50	64.8
4.75	56.7
2.36	46.7
2.00	42.5
1.18	37.4
0.600	34.6
0.425	31.5
0.300	26.4
0.150	22.4

Signature    
مكتب معامل الاستشارات الهندسية  
الساحل الشمالي 02  
المرور الرئيسي - شارع الملك الأفضل - الزمالة - القاهرة

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Materials finer than 75  $\mu$ m (no.200) sieve  
by washing ASTM D-1140.**

Test	Results (%)
Percentage of material finer than Sieve Size 75 $\mu$ m (No.200)	13.5

Signature / .....



Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Results of liquid limit and plasticity index  
of soils according to ASTM D-4318**

Test	Results (%)
Liquid Limit	26.1
Plastic Limit	20.4
Plasticity Index	5.7

Signature:  



Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Soil Classification According to Project Specs (Embankment)**

TEST	Results (%)	Limits according Projects Specs	
Group Classification	(A-1-b)	(A-1-a)	(A-1-b)
2.00 mm (No.10).	42.5	Max 50 %	-----
0.425 mm (No. 40).	31.5	Max 30 %	Max 50 %
0.075 mm (No. 200).	13.5	Max 15 %	Max 15 %
Characteristics of fraction passing 0.425 mm (No.40)			
Liquid Limit .....	26.1	-----	-----
Plasticity index .....	5.7	Max 6 %	Max 6 %

The test results are (☒ Comply - ☐ Not Comply) with specifications limits

Signature /

**CEL**  
مكتب معامل الاستشارات الهندسية  
الساحل الشمالي 02  
توقيع المهندس / طارق السيد - المهندس / محمد

5

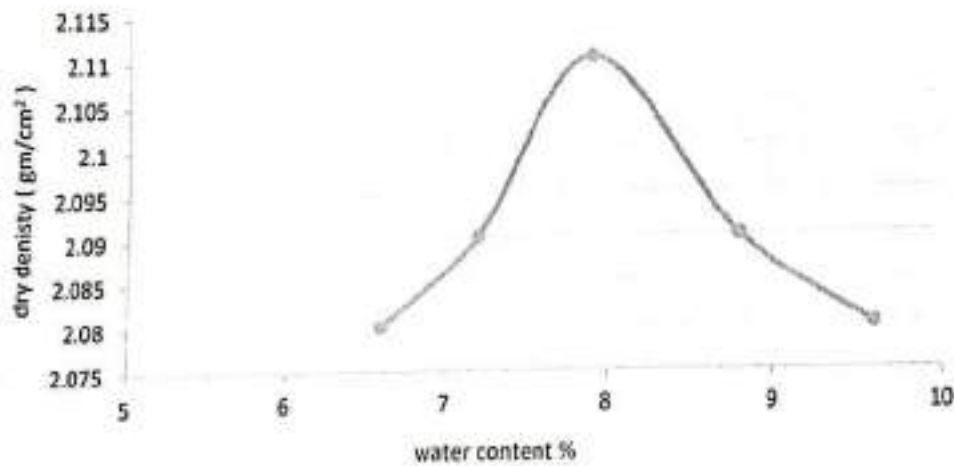
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Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

**Moisture – Density relation of soil**  
**Test result (Modified proctor test)**  
**ASTM D-1557**



- Max dry density (gm/cm³) : 2.11
- Optimum moisture content % : 7.9

Signature :   
المهندس / **الساحل الشمالي 02**  
المهندس / **الساحل الشمالي 02**

Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
 Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
 Type of sample : Soil Embankment  
 Location : St. 335+480 : 336+480  
 Delivery Date : 18/11/2023  
 Reporting Date : 29/11/2023  
 Reporting No. : 007  
 Sample No. : 04

**Test Results of California Bearing Ratio on Base Materials**  
**ASTM D 1883**

penetration		stress on piston (Mpa)
mm	Inch	
0.64	0.025	1.02
1.27	0.050	1.34
1.91	0.075	1.78
2.54	0.100	2.09
3.18	0.125	2.38
3.81	0.150	2.71
4.45	0.175	2.97
5.08	0.200	3.29
5.71	0.225	3.52
6.35	0.250	3.71

CBR Result	Stress (Mpa)		CBR %
At 0.1 inch (2.54 mm) penetration	St. Value	Sample results	30.3
	6.90	2.09	

**Notes :**

- 1- Attached graph shows penetration resistance versus penetration magnitude.
- 2- The sample was compacted to dry density of 2.11 (gm/cm<sup>3</sup>) at 7.9 % optimum water content.
- 3- Surcharge load 4.50 Kg.

Signature

**CEL**  
 مكتب معامل الاستشارات الهندسية  
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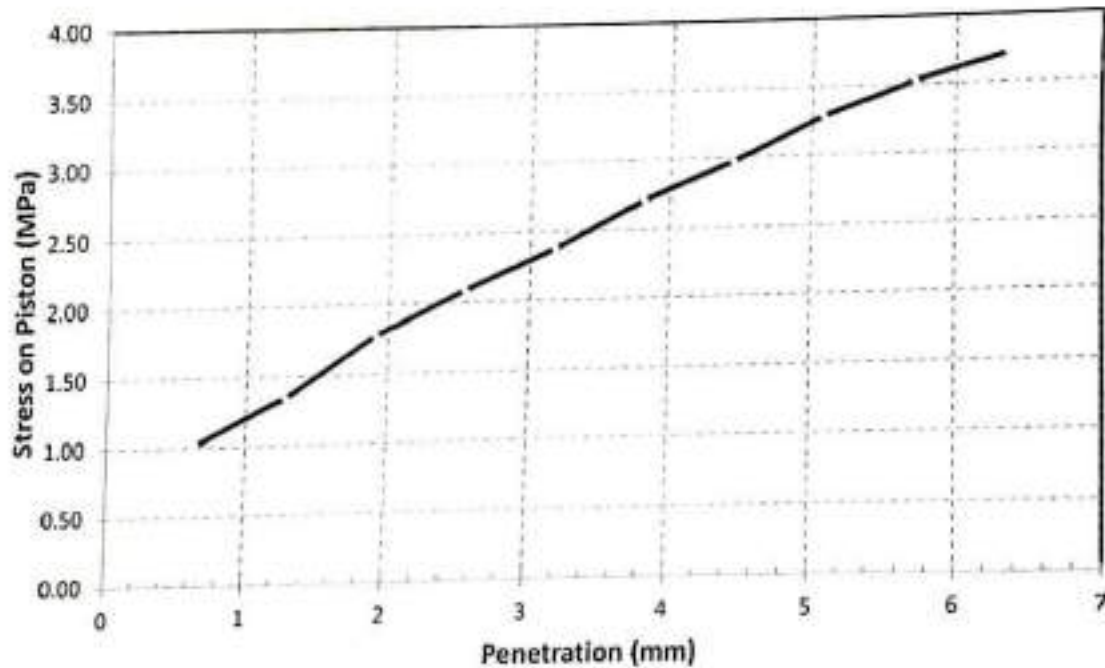
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Company Name : المكتب الدولي الحديث للمقاولات العامة و التوريدات  
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh  
Type of sample : Soil Embankment  
Location : St. 335+480 : 336+480  
Delivery Date : 18/11/2023  
Reporting Date : 29/11/2023  
Reporting No. : 007  
Sample No. : 04

## Load Penetration Curve of CBR Test

### ASTM D-1883



Signature /

CEL  
مكتب معامل الاستشارات الهندسية  
المساحل الشماليين 02  
لغرض التوقيع - شهادة الاختبار - الترخيص

# CEL

Consulting Engineering Bureau & Laboratories

مكتب معامل الإستشارات الهندسية

Company  
Project  
Delivery Date  
Report Date  
Sample Id  
Report No.

المكتب الدولي الحديث للمطاولات العامة والتوريدات :  
: Electric express train.  
: 23/11/2023  
: 02/12/2023  
: soil embankment (335+480:336+500)  
: 007

**ORGANIC OF SOIL ASTM D 2974**  
**METHOD TYPE D**

Test	Results
Amount of organic Content %	NIL



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Contractor Company	ELDAWLY ELHADES		Designer Company	(Khaled Haddi) Engineering Consulting Office								
Issued by Contractor	Name	Sign	Date/Serial Number	Time								
	Eng. Saleh	Saleh	1/1/2024 (M.A.R) 17/1	8:00								
Received by GARH CONSULTANT	Khaled Zaki		MAR	C1	C2	C3	D0	M0	Y0	Y1	Y2	Y3
				335	1W	LS	2	1	24	8	0	0

CODE - 2	S1 to S21	D1 to S3	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is us
CODE - 3	Work Activity		
	Sub Element of Activity		




Description of Materials	Fill Layer Total Quantity (55000 m <sup>3</sup> )		
Location to be Used	From Station 335+480 to Station 336+480		
Sample only	Yes	Materials Type	Fill Layers
Supplier Name	EL SEWY	Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (D 41.2) VERSION 2 BY CH2M HILL GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	
Comments by: ( KK )		Comments by: Eng. Alaa Abd-Allatif (ER)	
1-Quality test Result By Site Laboratory is Approved.		1-All tests were selected for Quality test and were carried out by material engineer for both contractor and GARH consultant.	
2-This Sample Representative ( 5000 m <sup>3</sup> ) only.		2-Results report attached and acceptable with the project specifications	
		3-Final approval is subject to above mentioned comments	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC
Contractor	Eng. Saleh Mohamed	Saleh		A
QA/QC *		Khaled Zaki		A
GARB **	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	[Signature]	4-1-2024	Awc

\* Designer

\*\* Approved/Design Consultant only



 ENGINEERING CONSULTING OFFICE المكتب الاستشاري الهندسي ا.د. نجاد كندل	 وزارة النقل والبنية التحتية MINISTRY OF TRANSPORT AND INFRASTRUCTURE	Electric Express Train - HSR	 الهيئة العامة للغمرات (DARS)
		From El Ain El Sokhna City To El Alamain - MATROUH	
		Section - 5 From BORG ALARAB To ALHAMMAM	
From Station 325+400 To Station 358+000			
Operating Lab			

### PARTICLE SIZE DISTRIBUTION OF SOIL

TESTING DATE:	3/1/2024	Code		ZONE	336+200 to 336+240
LOCATION	حديقة من المشون	OT-4			
NAME COMPANY	المكتب الدولي				

1-visual inspection test

2-Gradient test

A-gradation of bulk materials				SAMPLE WEIGHT (g)		21500.00		gm	table classify	
sieve size	2	1.5	1	4/3	2/1	8/3	# 4	PASS	soil classify	
(g)Mass retained	0.0	355.0	875.0	1578.0	1963.0	2156.0	2365.0		A-1-b	
(g)Cumulative Retained	0.0	355.0	1230.0	2808.0	4771.0	6927.0	9292.0		PRO	2.12
Cumulative Retained %	0.0	1.7	5.7	13.1	22.2	32.2	43.2		WC	7.00
Cumulative Passing %	100.0	98.3	94.3	86.9	77.8	67.8	56.8		CBR	

B-soft material gradation				WT.OF sample		500.00		gm
sieve size	10	40	200					
(g)Cumulative Retained	75.00	180.00	380.00					
Cumulative Retained %	15.00	36.00	76.00					
Cumulative Passing %	85.00	64.00	24.00					

C-General gradient										
(in)sieve size	2	1.5	1	3/4	1/2	3/8	# 4	# 10	# 40	# 200
(mm)sieve size	50.0	37.5	25.0	19.0	12.5	9.5	4.75	2.00	0.425	0.075
Cumulative Passing %	100.0	98.3	94.3	86.9	77.8	67.8	56.8	48.3	36.3	13.6




ATTERBERG LIMITS	(L.L.)LIQUID LIMIT	(P.L.)PLASTIC LIMIT	(P.I.)PLASTIC INDEX
	N.P	N.P	N.P

Contractor

Saleh

Consultant

Ahmed Gaki

 وزارة النقل والبنى التحتية Ministry of Transport and Public Works	 الهيئة العامة للسكك الحديدية General Authority of Railways	<b>Electric Express Train - HSR</b> From El Ain El Sokhna City To El Alamein - MATROUH Section - 6 From BORG ALARAB To ALHAMMAM From Station 325+400 To Station 358+000	 وزارة التخطيط Ministry of Planning

## PROCTOR TEST

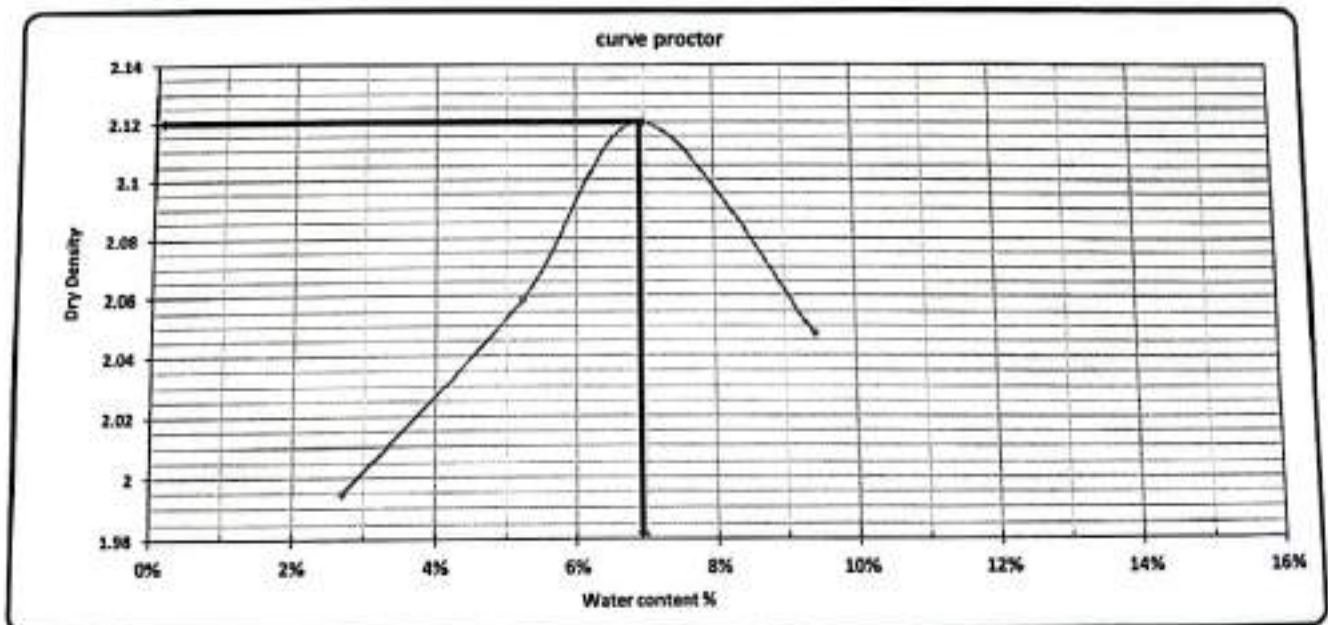
TESTING DATE:	4/1/2024	Code	ZONE	336+20 to 336+240
LOCATION	محطة نربة من المشون	QT-34		
NAME COMPANY	المكتب الدولي			

Weight of empty mold :	5860.0
Mold Volume:	2121.0

MAX Dry Density	2.12
Water content %	7

trial no :	1	2	3	4	
Wt. Of Mold + wet soil	10285.0	10455.0	10670.0	10611	
WT. WET SOIL	4345.0	4595.0	4810.0	4751.0	
Wt. Density	2.049	2.166	2.268	2.240	

Tare No.	33		5		90		16			
Tare wt.	73.7		59.7		62.5		33.8			
Wt. Of wet soil & tare	150.0		150.0		150.0		150.0			
Wt. Of dry soil & tare	148.0		145.5		144.3		140.0			
Wt. Of water	2.0		4.5		5.7		10.0			
Wt. Of dry soil	74.3		85.8		81.8		106.2			
Water content %	2.7%	2.7%	5.2%	5.2%	7.0%	7.0%	9.4%	9.4%		
AV. Water content %	2.7%		5.2%		7.0%		9.4%			
Dry Density	1.995		2.059		2.120		2.047			

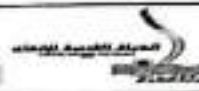


Contractor  
Saleh

Consultant  
phased Caki



# MATERIAL INSPECTION REQUEST



Contractor Company	EL DAWLY ELHADETH		Designer Company	KJO Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Saleh	<i>Saleh</i>	29/07/2023 (P.L.T -Bed Excavation-1)	2:00 PM							
Received by GARBU CONSULTANT	Eng. Sayed Saif	<i>Sayed Saif</i>	MIR	C1	C2	C3	DD	MM	YY	HH	MM
				336	EW	CS	30	7	23	2	0

CODE-1	S1 to S21	D1 to S2	Kp XXX Note
	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-2	Work Activity		
CODE-3	Sub Element of Activity		

Description of Materials	Bed Excavation				
Location to be Used	From	336+000	TO	336+200	
MAR & UIR Approval No	UIR C-1		Date	24/06/2023	
	M.A.R. QT-Bed excavation-1			01/08/2023	
Supplier Name	ELOROUBA				
Test Requirement	P.L.T(DIN 18134)		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP	
Reference Photos	No/Yes		Other		
Item	Description	Unit	Quantity	Arrival Date	Note
1	PLATE LOAD TEST	NUMBER	2	30/07/2023	
2					
3					
4					
Comments by: (K.K.)			Comments by: Eng. Alaa Abd-Allatif (ER)		
1-The PLATE LOAD Test Result P.L.T. by third party lab ( egypt-Japan University Of Science And Tecnology) is Approved.			1-P.L.T was carried- out by third party lab ( egypt-Japan University Of Science And Tecnology) . 2-Results report attached and acceptable with project specifications. 3-Final approval is subject to above mentioned comments.		

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh	<i>Saleh</i>		A
QA/QC *	Eng. Sayed Saif	<i>Sayed Saif</i>		A
GARB**	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa Abd-Allatif</i>	31-7-2023	Awc

\* Designer

\*\* Assigners/Bridges: Culvert only



## Technical Report

### Plate Loading Tests

KM 336+100 to 336+200, KM 336+000 to 336+100,  
and KM 335+900 to 336+000

Native Soil

### Project

Electric Express Train (Sokhna - New capital - 6th  
of October city - New Elalamein city)

Prepared for

ELDAWLY ELHADETH Company

Sinai, Egypt

يعتمد  
امين عام الشركة  
(2023)  
أستاذة زنت





## 1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by ELDAWLY ELHADETH Company to conduct 3 plate loading tests on the Native Soil of the Electric Express Train project at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Saleh Mohamed of ELDAWLY ELHADETH Company. Field team members (Sameh Hassan & Ahmed Sabry) from the working CETCU team visited the project site on July, 2023 and performed the required tests. This report summarizes the plate loading test procedure according to DIN18134, the test results and their interpretations, and the CETCU pertaining recommendations.

## 2. Test Set Up and Instrumentation

- The German standard DIN18134 was applied to define the test setup including the loading system, test conditions, and procedure for the plate loading tests.
- The tests were carried out to determine the Strain Moduli ( $E_{v1}$  and  $E_{v2}$ ) and their ratio ( $E_{v2}/E_{v1}$ ) from a stress – deformation relationship of two consecutive loading from Loading-Unloading-Loading regime.
- The loading plate has a diameter of 600 mm and a thickness of 25 mm and it is provided with equally spaced stiffeners. The upper plate face is parallel to the bottom face of the plate to allow a 300-mm plate to be placed on the 600-mm plate top.
- The loading system consisted of a hydraulic pump connected to a hydraulic jack of 700 bar capacity, which can apply and release the load increments.
- The dial gauge used to measure the plate settlement has a resolution of 0.01 mm and the lever ratio was equal to 1.
- The temperature at the time of the test was  $31 \pm 1^\circ\text{C}$ .
- The plate was carried out on a Native Soil (according to the company) at 3 points (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000). The test surface area was levelled, and the plate was bedded on this surface.
- The hydraulic jack was placed on the middle of, and normal to, the loading plate beneath the reaction loading system and secured against tilting.
- The reaction loading system was a heavy multi-purpose Loader CAT 966G.





### 3. Test Procedure and Results

The plate load test was conducted in accordance with the DIN18134. Loading, unloading, and reloading regimes were considered to estimate the resilient modulus of the tested soil. Prior to the test, the force transducer and dial gauge were reset to zero, and then a load corresponding to a stress of 0.01 MN/m<sup>2</sup> was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m<sup>2</sup> was reached, and the loading increment was 0.025 MN/m<sup>2</sup>. The load was gradually released in four stages. Following unloading, a second loading cycle was performed, but the load was only increased to the penultimate stage of the first cycle. 3 plate loading tests on the Native Soil of the Electric Express Train project were conducted at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) and the data collected at the 3 test points is included in Appendix A.

Table 1 presents the load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200), while Table 2 shows the data obtained at the second loading stage.

**Table 1: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200)**

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.60
2	14.14	0.050	0.75
3	21.21	0.075	1.04
4	28.28	0.100	1.26
5	35.35	0.125	1.52
6	42.42	0.150	1.79
7	49.49	0.175	2.10
8	56.56	0.200	2.35
9	63.63	0.225	2.54
10	70.7	0.250	2.80
11	56.56	0.200	2.80
12	49.49	0.175	2.60
13	35.35	0.125	2.35
14	21.21	0.075	1.99
15	1.414	0.005	0.70







Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+100 to 336+200)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.70
1	7.07	0.025	1.08
2	14.14	0.050	1.36
3	21.21	0.075	1.63
4	28.28	0.100	1.87
5	35.35	0.125	2.08
6	42.42	0.150	2.25
7	49.49	0.175	2.42
8	56.56	0.200	2.59
9	63.63	0.225	2.75

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 336+100 to 336+200) are shown in Figure 1. Table 3 shows the calculations of the resilient modulus of the tested soil according to DIN18134. The testing data corresponding to the second testing point (KM 336+000 to 336+100) is provided in Tables 4-6 and Figure 2. The testing data corresponding to the third testing point (KM 335+900 to 336+000) is provided in Tables 7-9 and Figure 3.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+100 to 336+200)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.31	0.70
$a_1$ (mm/(MN/m <sup>2</sup> ))	9.65	13.78
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	1.64	-21.42
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,max})$	44.72	53.37
$Ev_2/Ev_1$	1.19	



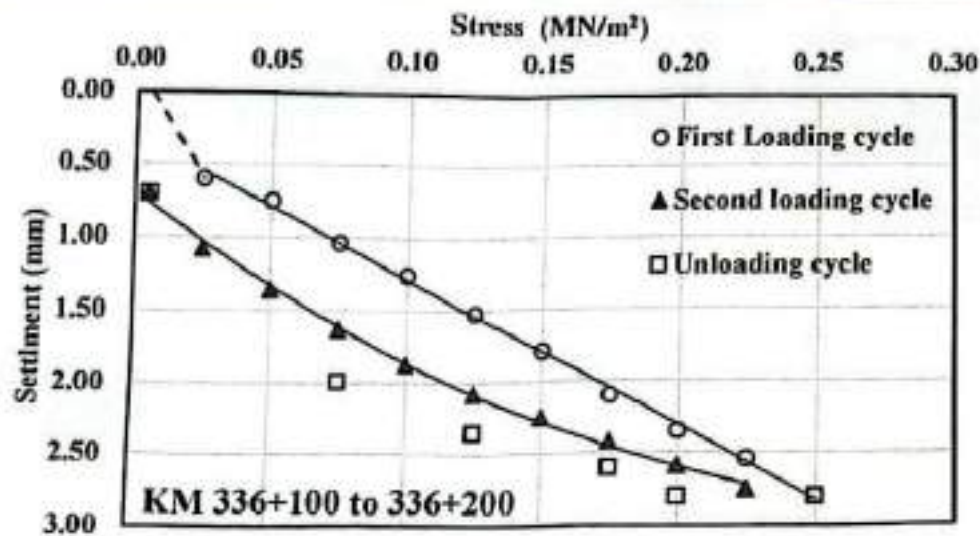


Figure 1: Load-settlement data: plate loading test performed at (KM 336+100 to 336+200)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 336+000 to 336+100)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	$\text{MN/m}^2$	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.37
2	14.14	0.050	0.56
3	21.21	0.075	0.78
4	28.28	0.100	0.97
5	35.35	0.125	1.16
6	42.42	0.150	1.36
7	49.49	0.175	1.52
8	56.56	0.200	1.70
9	63.63	0.225	1.86
10	70.7	0.250	1.99
11	56.56	0.200	1.99
12	49.49	0.175	1.85
13	35.35	0.125	1.68
14	21.21	0.075	1.35
15	1.414	0.005	0.44







Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 336+000 to 336+100)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.44
1	7.07	0.025	0.73
2	14.14	0.050	0.87
3	21.21	0.075	1.00
4	28.28	0.100	1.09
5	35.35	0.125	1.30
6	42.42	0.150	1.47
7	49.49	0.175	1.63
8	56.56	0.200	1.75
9	63.63	0.225	1.84

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 336+000 to 336+100)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.14	0.47
$a_1$ (mm/(MN/m <sup>2</sup> ))	9.02	7.54
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-6.24	-6.05
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,MAX})$	60.31	74.69
$Ev_2/Ev_1$	1.24	

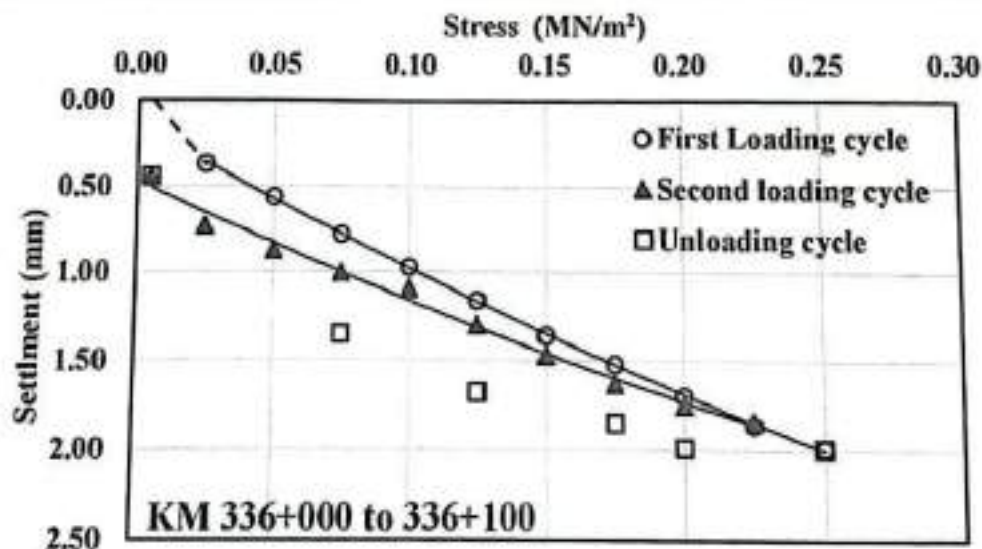


Figure 2: Load-settlement data: plate loading test performed at (KM 336+000 to 336+100)





Table 7: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 335+900 to 336+000)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.41
2	14.14	0.050	0.56
3	21.21	0.075	0.86
4	28.28	0.100	1.05
5	35.35	0.125	1.27
6	42.42	0.150	1.44
7	49.49	0.175	1.55
8	56.56	0.200	1.83
9	63.63	0.225	2.06
10	70.7	0.250	2.20
11	56.56	0.200	2.05
12	49.49	0.175	1.95
13	35.35	0.125	1.80
14	21.21	0.075	1.36
15	1.414	0.005	0.50

Table 8: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 335+900 to 336+000)

Loading stage	Load (F)	Normal stress ( $\sigma_0$ )	Settlement (S)
	kN	MN/m <sup>2</sup>	mm
0	1.414	0.005	0.50
1	7.07	0.025	0.67
2	14.14	0.050	0.88
3	21.21	0.075	1.03
4	28.28	0.100	1.22
5	35.35	0.125	1.40
6	42.42	0.150	1.56
7	49.49	0.175	1.73
8	56.56	0.200	1.88
9	63.63	0.225	1.95

Table 9: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 335+900 to 336+000)

Parameters	1st loading cycle	2nd loading cycle
( $s_{0,max}$ ) MN/m <sup>2</sup>	0.25	0.25
$a_0$ (mm)	0.18	0.46
$a_1$ (mm/(MN/m <sup>2</sup> ))	8.75	8.57
$a_2$ (mm/(MN <sup>2</sup> /m <sup>4</sup> ))	-2.61	-7.98
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,MAX})$	55.57	68.48
$Ev_2/Ev_1$	1.23	

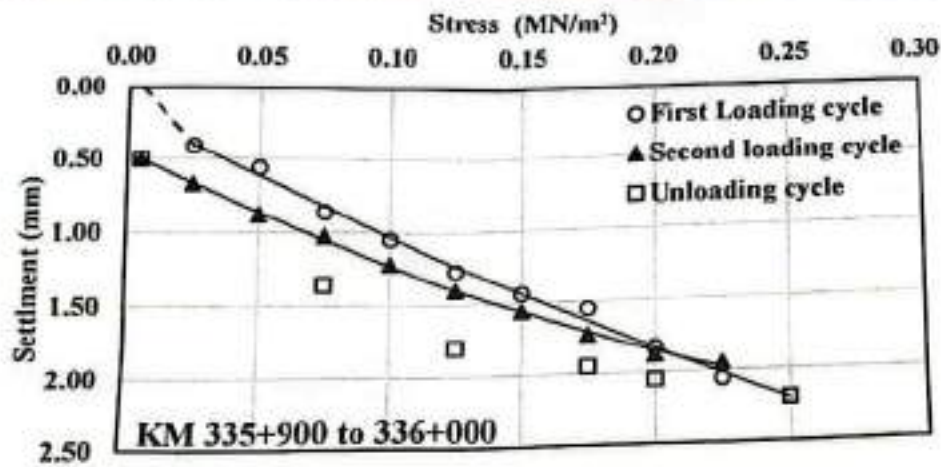


Figure 3: Load-settlement data: plate loading test performed at (KM 335+900 to 336+000)





#### 4. Closure

Test results presented herein report the load-settlement data obtained from 3 plate loading tests conducted on the Native Soil of the Electric Express train project at 3 locations (KM 336+100 to 336+200, KM 336+000 to 336+100, and KM 335+900 to 336+000) in accordance with German Standard, DIN18134.

Location	$E_{v1}$ MN/m <sup>2</sup>	$E_{v2}$ MN/m <sup>2</sup>	$E_{v2}/E_{v1}$ ratio
KM 336+100 to 336+200	44.72	53.37	1.19
KM 336+000 to 336+100	60.31	74.69	1.24
KM 335+900 to 336+000	55.57	68.48	1.23

• Note: Before interpreting these test results for future applications, the Native Soil in-situ variability between the testing locations should be considered.

#### Technical committee

Dr. Mahmoud Ahmed

Prof. Dr. Mohamed F. M. Fahmy

#### Lab Engineer

Mohamed A. Al-Najjar









Location of test site:	KM 336+100 to 336+200		Field team	Samah Hassan & Ahmed Sabry
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	19/7/2023
Diameter of loading plate	600		Time	9:40:00 AM 10:07:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Native Soil			
Bedding material	---			
Temperature	31°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.40	
	2	14.14	9.25	
	3	21.21	8.96	
	4	28.28	8.74	
	5	35.35	8.48	
	6	42.42	8.21	
	7	49.49	7.90	
	8	56.56	7.65	
	9	63.63	7.46	
	10	70.7	7.20	
Unloading Stage	11	56.56	7.20	
	12	49.49	7.40	
	13	35.35	7.65	
	14	21.21	8.01	
	15	1.414	9.30	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.30	
	1	7.07	8.92	
	2	14.14	8.64	
	3	21.21	8.37	
	4	28.28	8.13	
	5	35.35	7.92	
	6	42.42	7.75	
	7	49.49	7.58	
	8	56.56	7.41	
	9	63.63	7.25	

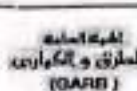
Location of test site:	KM 336+000 to 336+100		Field team	Sameh Hassan & Ahmed Sabry
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	19/7/2023
Diameter of loading plate	600		Time	10:12:00 AM 10:39:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Native Soil			
Bedding material	---			
Temperature	31°C			
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.63	
	2	14.14	9.44	
	3	21.21	9.22	
	4	28.28	9.03	
	5	35.35	8.84	
	6	42.42	8.64	
	7	49.49	8.48	
	8	56.56	8.30	
	9	63.63	8.14	
	10	70.7	8.01	
Unloading Stage	11	56.56	8.01	
	12	49.49	8.15	
	13	35.35	8.32	
	14	21.21	8.65	
	15	1.414	9.56	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.56	
	1	7.07	9.27	
	2	14.14	9.13	
	3	21.21	9.00	
	4	28.28	8.91	
	5	35.35	8.70	
	6	42.42	8.53	
	7	49.49	8.37	
	8	56.56	8.25	
	9	63.63	8.16	





Location of test site:	KM 335+900 to 336+000		Field team	Sameh Hassan & Ahmed Sabry
Project title:	Electric Express Train Project - ELDAWLY ELHADETH Company		Date:	19/7/2023
Diameter of loading plate	600		Time	10:44:00 AM 11:11:00 AM
Lever ratio	1		Note: CAT 966G	
Type of Soil	Native Soil			
Bedding material	---			
Temperature	31°C		Dial Gauge Reading (mm)	
Test regime	Loading Stage No.	Load (kN)		
Loading Stage	0	1.414	10.00	
	1	7.07	9.59	
	2	14.14	9.44	
	3	21.21	9.14	
	4	28.28	8.95	
	5	35.35	8.73	
	6	42.42	8.56	
	7	49.49	8.45	
	8	56.56	8.17	
	9	63.63	7.94	
	10	70.7	7.80	
Unloading Stage	11	56.56	7.95	
	12	49.49	8.05	
	13	35.35	8.20	
	14	21.21	8.64	
	15	1.414	9.50	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.50	
	1	7.07	9.33	
	2	14.14	9.12	
	3	21.21	8.97	
	4	28.28	8.78	
	5	35.35	8.60	
	6	42.42	8.44	
	7	49.49	8.27	
	8	56.56	8.12	
	9	63.63	8.05	

# MATERIAL APPROVAL REQUEST



Contractor Company	ELDAWLY ELHADES		Designer Company	(Khaled Kandil) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Saleh	<i>Saleh</i>	31/07/2023 (M.A.R. Bed excavation -1)	8:00							
Received by GARB CONSULTANT		<i>Khaled Zaki</i>	MAR	C1	C2	C3	D0	MM	YY	HH	MM
				335	EW	CS	1	8	23	8	0

CODE-1	S1 to S21	D1 to S1	Kp XXX Note
CODE-2	Station Reference	Depot Reference	For Kilometer point only Start Km is used
CODE-3	Work Activity		
CODE-4	Sub Element of Activity		

Description of Materials	Bed Excavation		
Location to be Used	From Station 335+480 to Station 336+480		
Sample only	Yes	Materials Type	Bed Excavation
Supplier Name		Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 BY CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	
Comments by: ( KK )		Comments by: Eng. Alaa Abd-Allatif (ER)	
1-Quality test Result By Site Laboratory is Approved.		1-All tests were selected for Quality test and were carried-out by material engineer for both contractor and GARB consultant . 2-Results report attached and acceptable with the project specifications. 3-Final approval is subject to above mentioned comments.	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Saleh Mohamed	<i>Saleh</i>		A
QC *		<i>Khaled Zaki</i>		A
GRB **	Eng. Margrit Magdi			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa</i>	2-8-2023	Awc
Designer				

Alignment/Bridges: Culvert only



Project	Electrical Express Train From Borg Alarah to Alamein (EET)			Date	1-Aug-23
Company	شركة المكتب الدولي - لاج حفر			Request NO.	1
Station	From		TO		

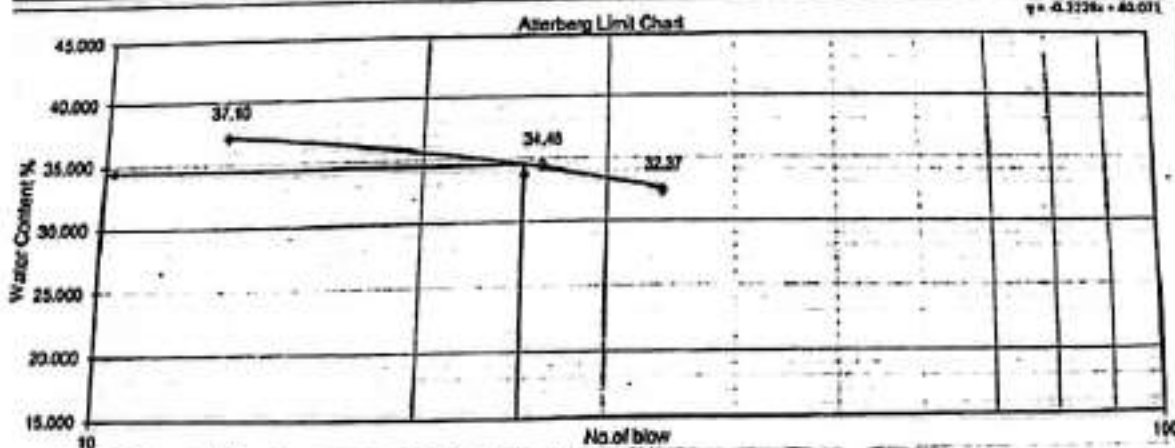
1- Sieve Analysis of Fine and Coarse Aggregates ASTM C 136

wt. of coars sample =	1000		
Sieve "inch"	total retain (gm)	pass %	Specs Limits %
2"	0	100	
1.5"	0	100	
1"	0	100	
3/4"	0	100	
3/8"	0	100	
4	0	100	
wt. of fine sample =	1000		
Sieve No.	total retain (gm)	total pass %	Specs Limits %
30	8	99.20	
40	22	97.80	
200	252	74.80	

2- Liquid Limit, Plastic Limit, and Plasticity Index ASTM D 4318

test	Liquid Limit			Plastic Limite	
Number of blows	13	26	34	4	13
Number of plate	7	8	5		
Wt. Of plate	33.17	31.73	31.57	31.72	32.15
wt. of plate + wt. of wet sample	54.16	49.36	51.36	32.96	33.85
wt. of plate + wt. of dry sample	48.48	44.84	46.52	32.76	33.58
wt. of water	5.68	4.52	4.84	0.2	0.27
wt. of dry sample	15.31	13.11	14.95	1.04	1.43
moisture content	37.10	34.48	32.37	19.23	18.88
The Limits	Liquid Limit			Plastic Limite	
				19.06	

q = 0.3228x + 43.071



Liquid Limit	34.5
plasticity index	15.4
Group Classification	A6

Salah  
Eng. / CONSULTANT

Eng. / CONTRACTOR  
Pharvel Zaki





المهندسة العامة لخدمات البنية التحتية

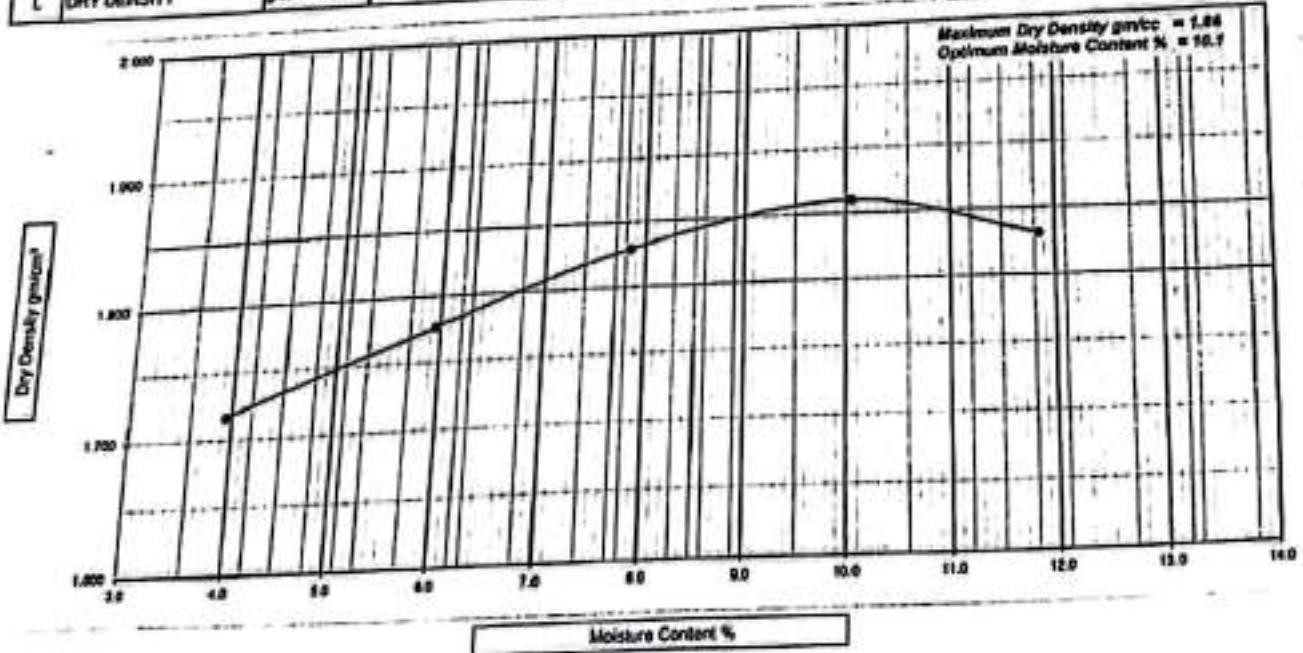


مكتب إدارة مشاريع  
Electrical Express Train From Borg Alazab to Alamein



Project	Electrical Express Train From Borg Alazab to Alamein (EET)			Date	1-Aug-23
Company	شركة المكتب الدولي - لاس حار			Request NO.	1
Station	From		TO		

				MOISTURE CONTENT									
CONTAINER NUMBER				A-7	A-1	A-13	A-15	A-17	A-25	A-14	A-12	A-11	A-10
A	MASS WET SOIL & TARE	gms.		162.3	185.5	179.0	189.3	199.0	185.4	171.4	185.4	186.0	197.0
B	MASS DRY SOIL & TARE	gms.		157.3	179.5	170.5	180.1	186.7	173.8	158.4	170.5	169.4	179.0
C	TARE MASS	gms.		31.3	32.5	31.5	32.1	33.2	32.0	32.4	31.5	33.0	32.5
D	MASS OF WATER	gms.	A-B	5.0	6.0	8.5	9.2	12.3	11.8	13.0	14.9	16.5	18.0
E	MASS OF DRY SOIL	gms.	B-C	126.1	147.0	139.0	148.0	153.5	141.6	126.0	139.0	136.4	146.5
F	MOISTURE CONTENT	%	$\frac{D}{E} \times 100$	3.8	4.1	5.8	6.1	7.8	7.9	9.9	10.2	11.9	11.8
AVERAGE		%		3.9		6.0		7.9		10.1		11.9	
				DRY DENSITY									
TRIAL NUMBER				1	2	3	4		5				
G	MASS OF MOLD & WET SO	gms.		9131	9342	9540	9700		9701				
H	MASS OF MOLD	gms.		5260	5260	5260	5260		5260				
I	MASS OF WET SOIL	gms.	G-H	3871	4082	4280	4440		4441				
J	VOLUME OF MOLD	cm <sup>3</sup>		2169	2169	2169	2169		2169				
K	WET DENSITY	g/cm <sup>3</sup>	$\frac{I}{J}$	1.785	1.862	1.973	2.047		2.047				
L	DRY DENSITY	g/cm <sup>3</sup>	$\frac{K}{1+W}$	1.72	1.78	1.83	1.86		1.86				



*Ester*  
Eng. / CONSULTANT

Eng. / CONTRACTOR  
*Khaleel Zaki*