

محضر استلام موقع

مشروع: أعمال الجسر الترابي والأعمال الصناعية لمشروع القطار الكهربائي السريع (العين السخنة - مطروح) لتنفيذ أعمال الجسر الترابي قطاع (برج العرب - العلمين) في المسافة من الكم 335+000 الى الكم 335+060 بطول 0.06 كيلو متر .

تنفيذ: شركة علاء الدين وشركاؤه للمقاولات المتكاملة.

إشراف : المنطقة الخامسة - منطقة غرب الدلتا

طبقاً للعقد رقم (٢٠٢٥/٢٠٢٤/٤١٢) بتاريخ ٢٠٢٤/١٠/٣٠

إنه في يوم الأربعاء الموافق ٢٠٢٤/١١/٢٠ اجتمع كل من:-

- ١- السيد المهندس/محمد حسني فياض مدير عام مشروعات - الهيئة العامة للطرق والكباري
- ٢- السيدة المهندسة/مارجريت مجدي زاهر مدير مشروع - الهيئة العامة للطرق والكباري
- ٣- السيد المهندس/ربيع رشدي مدير مشروع - شركة علاء الدين وشركاؤه للمقاولات المتكاملة

وذلك للمرور على مسار العملية المذكورة عاليه لاستلام الموقع :-
وقد تبين أن الموقع خالياً من العوائق الظاهرية ويسمح بالبدء في التنفيذ وبناء عليه يعتبر تاريخ ٢٠٢٤/١١/٢٠ هو تاريخ استلام الموقع وبدء الأعمال بالعملية واقفل المحضر على ذلك ووقع الحضور

التوقيعات

رئيس الإدارة المركزية
منطقة غرب الدلتا

الاسكندرية - مرسى

مطروح

عميد . مهندس /

"هاني محمد محمود طه"

٣- ربيع رشدي

٢- هاني محمد محمود طه

١- محمد حسني فياض

المنطقة الخامسة - (غرب الدلتا)

السيد المهندس / رئيس قطاع التنفيذ والمناطق

تحية طيبة.. وبعد،،

بالإحالة إلى مشروع القطار الكهربائي السريع قطاع (برج العرب - العلمين) (القطاع الخامس-أ)

نتشرف بأن نرفق لسيادتكم طيه المقايضة المعدلة بعد المفاوضة بتاريخ

٢٠٢٣/١٢/١٨ للقطاع الاتي :

الشركة	من كم	الى كم
علاء الدين وشركاؤه للمقاولات المتكاملة	٣٣٥+٠٠٠	٣٣٥+٠٦٠

برجاء من سيادتكم التفضل بالأحاطه والتوجيه بالازم

وتفضلوا بقبول فائق الاحترام والتقدير،،

٤

رئيس الإدارة المركزية

المنطقة الخامسة- غرب الدلتا

عميد مهندس /

"هاني محمد محمود طه"

مشروع القطار الكهربائي فائق السرعة قطاع (برج العرب - العلمين)
مرحلة تشكيل الجسر الترابي وطبقات الأساس والحمايات الخرسانية
المقاييس المعدلة بعد المفاوضة بتاريخ ٢٠٢٣/١٢/١٨ لينود الاعمال تنفيذ شركة علاء الدين وشركاه للمقاولات المتكاملة
القطاع من محطة ٣٣٥+٠٠٠ إلى ٣٣٥+٠٦٠ بطول ٦٠ م
طبقا للعقد رقم ٤١٢ / ٢٠٢٤ / ٢٠٢٥

رقم البند	بيان الأعمال	الوحدة	القيمة	الكمية	الاجمالي
المرحلة الاولى : اعمال الحفر وتشكيل الجسور					
١	اعمال الحفر بالمتن المكعب اعمال حفر باستخدام المعدات الميكانيكية لجميع انواع التربة عدا التربة الصخرية و تسوية السطح بالات التسوية والرش بالعماد الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول الى اقصى كثافة جافة (٩٥% من الكثافة الجافة القصوى) ومحمل على البند تحميل ونقل التربة الزائدة لمسافة ٥٠٠ متر من محور الطريق ويتم التنفيذ طبقا للمناسيب التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع مشتلاته طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف وفي حالة زيادة مسافة نقل نتج الحفر عن ٥٠٠ متر من محور الطريق يتم حساب ١ جنية لكلومتر زيادة .	م ^٣	٢٨,١٠	٨,٠٠٠,٠٠٠	٢٢٤,٨٠٠,٠٠٠
٢	اعمال الازالة و التطهير بالمتن المسطح اعمال تطهير الموقع من الاشجار والمزروعات والمخلفات في مناطق الدلتا ذات الطبيعة الزراعية الكثيفة والتخلص منها بالمقابل العمومية تمهيدا لاعمال الرفع المساحي لكامل حدود المشروع طبقا للشروط والمواصفات وتعليمات المهندس المشرف.	م ^٢	٦,٠٠	٤,٥٠٠,٠٠٠	٢٧,٠٠٠,٠٠٠

المرحلة الثانية : اعمال الردم					
٣	اعمال الردم اعمال تحميل وتوريد ونقل التربة مطابقة للمواصفات وتشغيلها باستخدام الات التسوية بسبك لا يزيد عن ٥٠ سم حتى منسوب ٢٠ متر ويسمك لا يزيد عن ٢٥ سم لاستكمال المنسوب التصميمي لتشكيل الجسر والاكثاف (نسبة تحمل كاليفورنيا لا تقل عن ١٥ %) ورشها بالعماد الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد بالهراسات للوصول الى اقصى كثافة جافة (٩٥ % من الكثافة الجافة القصوى) ويتم التنفيذ طبقا للمناسيب التصميمية والقطاعات العرضية النموذجية والرسومات التفصيلية المعتمدة والبند بجميع مشتلاته طبقا لاصول الصناعة ومواصفات الهيئة العامة للطرق والكباري وتعليمات المهندس المشرف وفي حالة طلب جهاز الاشراف زيادة نسبة الدمك عن ٩٥ % بحسب زيادة ١ جنية على زيادة نسبة الدمك لكل ١ % . -مسافة النقل حتى ٢ كم ويتم احتساب علاوة ١,٥ جنية لكل بالزيادة. -السعر يشمل عمل تشويبات وتخليط واختبارات ونقل لموقع العمل حتى مسافة ٢ كم . -السعر يشمل قيمة المادة المحجيرة .	م ^٣	١٠٥,٥٠	١٨,٠٠٠,٠٠٠	١,٨٩٩,٠٠٠,٠٠٠
	علاوة مسافة نقل للتربة لمسافة ١٣٩ كم = ١,٥٠١٣٧ = ٢٠٥,٥٠ جنية	م ^٣	٢٠٥,٥٠	١٤,٤٠٠,٠٠٠	٢,٥٥٩,٢٠٠,٠٠٠
	علاوة مسافة نقل للرمل لمسافة ١٠٩ كم = ١,٥٠١٠٧ = ١٦٠,٥٠ جنية	م ^٣	١٦٠,٥٠	٣,٦٠٠,٠٠٠	٥٧٧,٨٠٠,٠٠٠
	علاوة تحميل رسوم الكارتة والموازين طبقا للائحة الشركة الوطنية	م ^٣	١٣,٠٠	١٨,٠٠٠,٠٠٠	٢٣٤,٠٠٠,٠٠٠

المرحلة الثالثة : اعمال طبقات الاساس					
٤	طبقات الاساس بالمتن المكعب اعمال توريد وفرش طبقة تاسيس (prepared Subgrade) من الاحجار الصلبة المنكروجة ناتج تكسير الكسرات والمطابقة للمواصفات والاقصى حجم للحبيبات ١٠٠ مم والا تزيد نسبة الامار من مخلل ٢٠٠ عن ١٢ % و التكرج الوارد بالاشتراطات الخاصة بالمشروع لا تقل نسبة تحمل كاليفورنيا عن ٢٥ % و لا تزيد نسبة القاعد بجهاز لوس الجلوس عن ٢٠ % والا يزيد الامتصاص عن ١٥ % والا يقل معامل المرونة (Ev2) من تجربة لوح التحميل عن ٨٠ ميجاباسكال ويتم فرداها على طبقتين باستخدام الات التسوية الحديثة على ان لا يزيد سمك الطبقة بعد تمام الدمك عن ٢٥ سم و رشها بالعماد الاصولية للوصول الى نسبة الرطوبة المطلوبة والدمك الجيد للهراسات للوصول الى اقصى كثافة جافة قصوى (لا تقل عن ٩٥ %) من الكثافة المعملية والفلة تشمل اجراء التجارب المعملية والحقلية ويتم التنفيذ طبقا لاصول الصناعة والرسومات التفصيلية المعتمدة والبند بجميع مشتلاته طبقا للمواصفات الفنية للمشروع وتقرير الاستشاري وتعليمات المهندس المشرف -مسافة النقل ٢٠ كم - يتم احتساب علاوة ١,٣ جنية لكل ١ كم بالزيادة او النقصان	م ^٣	١٥٢,٠٠	١,٧٠٠,٠٠٠	٢٦٠,٠٠٠,٠٠٠
	قيمة المادة المحجيرة	م ^٣	١٦١,٠٠	١,٧٠٠,٠٠٠	٢٧٧,٧٠٠,٠٠٠
	علاوة مسافة النقل ١٢٠ كم = ١,٣٠ = ١٥٢,٠٠ جنية	م ^٣	١٥٦,٠٠	١,٧٠٠,٠٠٠	٢٦٥,٢٠٠,٠٠٠
	علاوة تحميل رسوم الكارتة والموازين طبقا للائحة الشركة الوطنية	م ^٣	٢٥,٠٠	١,٧٠٠,٠٠٠	٤٢,٥٠٠,٠٠٠

مدير مشروعات (الهيئة)

م / محمد حسنى قياض

مدير المشروع (الهيئة)

م / مارجريت مجدى

مدير المشروع الاستشاري

م / سيد سيف

الشركة المنفذة

م / ابراهيم رشدى

المكتب الاستشاري الهندسي
القطاع الكهربائي السريع
السيد سيف

شركة علاء الدين للمقاولات المتكاملة
٢٤/٦٢٠/٩٥٧
٥/١٧٩/٩٠٠/٢٢٠

طبقاً للعقد رقم ٤١٢ / ٢٠٢٤ / ٢٠٢٥

المرحلة الرابعة : اعمال الخرسانة

سبع ملايين وسبعمئة وثلاثة عشر ألفاً ومئتان جنيهاً فقط لا غير)

الشركة المنفذة

د لاسه راښودل

MATERIAL APPROVAL REQUEST



Contractor Company	ALADDIN(5)		Designer Company	(K.K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. MAHMOUD DIAB	<i>Mahmoud Diab</i>	14/08/2023 S5 -A-AD-5 -M.A.R. QT - 01	10:00							
Received by GARB CONSULTANT	Eng. SAIED SAIF	<i>[Signature]</i>	MAR	C1 335	C2 EW	C3 CS	DD 15	MM 8	YY 23	HH 10	MM 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	Fill Layer Total Quantity(3000 m3)		
Location to be Used	المشور		
Sample only	Yes	Materials Type	fill layers
Supplier Name		Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41 2) VERSION 2 CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	

Comments by: Eng.khaled Zaki (k.k)	Comments by: Eng. Alaa Abd-Allatif (ER)
QUALITY TEST RESULT IS APPROVED	1- one sample was selected for quality test 2- All tests were carried - out by comibassal Lab . 3- results attached and found acceptable and comply with proj. specs. 4- final approval is subject to above mentioned comments 5-The original copy is attached to (S5 -A-AD-2 -M.A.R. QT - 01)

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng.Mahmoud Diab	<i>Mahmoud Diab</i>		A
QA/QC *	Eng. SAIED SAIF	<i>[Signature]</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>[Signature]</i>	24-8-2023	Awc

* Designer

** Alignment/Bridges: Culvert: only



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SOIL REPORTS FOR ELECTRIC EXPRESS TRAIN PROJECT

Contractor : شركة علاء الدين وشركاؤه للمقاولات المتكاملة
Date : 24/8/2023
QC : 936



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I- Introduction

General Consultant : SYSTRA
Consultant : Dr/Khaled kandil
Contractor : شركة علاء الدين وشركاؤه للمقاولات المتكاملة
Sample : Ferma
Station : St(334+500)
Date of Test : 20/8/2023
QC : 936

II- Sample description:

Gravel and Sand job mix (80:20)

III- Required tests and Results

Required Tests		Results
1- Grain size analysis and classification and Percentage of MATERIALS FINER THAN No. 200 (75 µm)	Grain size analysis	As showed in appendix
	Classification	A-1-b
	Pass From No.200	9.0%
2- Modified compaction (Proctor test)	MDD	2.155
	OMC	6.6%
	LL	NP
3- Liquid limit, plastic limit and plasticity index	PL	NP
	PI	NP
4- California bearing ratio (CBR)	CBR ratio	30%

IV- Notes

- 1- Samples were brought by : Consultant
- 2- Samples are responsible from the Person who brought it.
- 3- The results are applying only for the present report.

LAB DIRECTOR

Eng / Eman kandil



Geotechnical consultant

For Dr. H. Dr. Mohamed Mostafa Badry

Kilo 23 Alexandria - Cairo Desert Road - Merghem

Tel: 002 03 4704595 - 002 034701191

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APPENDIX

Kilo 23 Alexandria - Cairo Desert Road - Merghem

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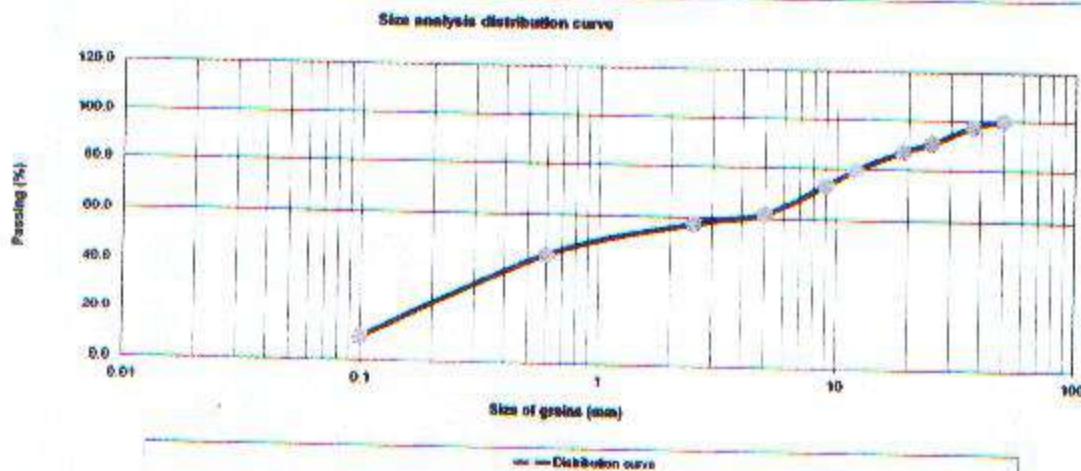
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PARTICLE SIZE DISTRIBUTION ANALYSIS ASTM C-136 / AASHTO T27

	WEIGHT RETAINED	CUMULATIVE WEIGHT	CUMULATIVE PERCENTAGE RETAINED (%)	CUMULATIVE PERCENTAGE PASSING (%)	STANDARD SPECIFICATION LIMITS
	(gm)	RETAINED (gm)	RETAINED (%)	PASSING (%)	
2	0.00	0.00	0.00	100.0	
1 1/2	256.00	256.00	2.56	97.4	
1	670.00	926.00	9.26	90.7	
3/4	359.00	1285.00	12.85	87.2	
1/2	781.00	2066.00	20.66	79.3	
3/8	609.00	2675.00	26.75	73.3	
No.4	1162.00	3837.00	38.37	61.6	
No.10	34.00	34.00	6.80	57.4	
No.40	145.00	145.00	29.00	43.8	
No.200	427.00	427.00	85.40	9.0	

Total sample weight = 10000.00 pass No.4= 6183.0 Total fine aggregates weight = 500 gm
% 61.6



Soil classification: A - 1 - b Sample is non plastic





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Modified Proctor Test Report ASTM - D 1557

Mould Number :- 1
Volume of mould = 2165 cm³
Weight of mould = 5854 g
G.S = 2.7 g/cm³

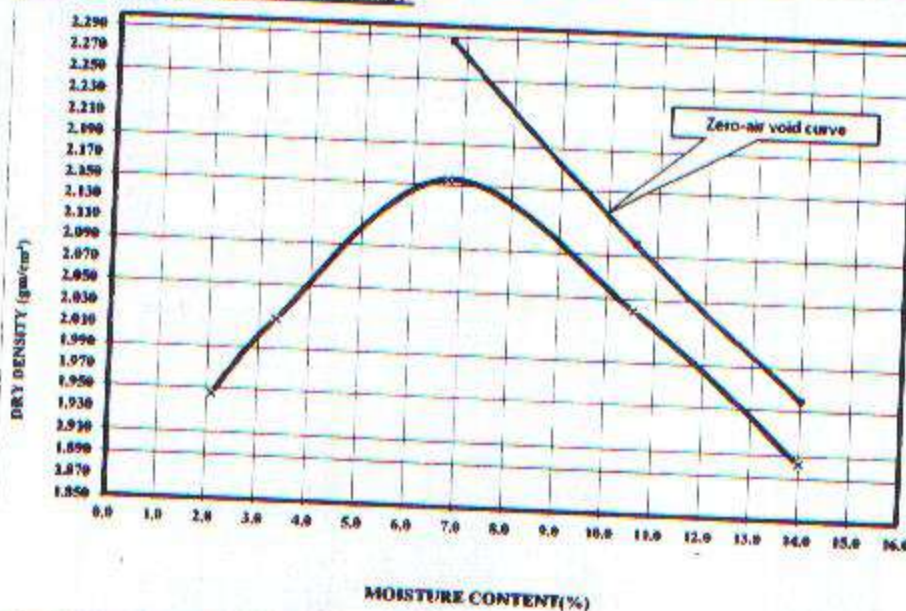
A- Density Calculations :-

	1	2	3	4	5
Weight of wet soil+mould (g)	9423	9646	10125	10023	9832
Weight of mould (g)	4994	4994	4994	4994	4994
Weight of wet soil (g)	4429	4652	5131	5029	4838
Volume of mould (cm ³)	2231	2231	2231	2231	2231
Wet density (g/cm ³)	1.985	2.085	2.300	2.254	2.169
Dry density (g/cm ³)	1.945	2.018	2.155	2.039	1.902
Zero-air Void curve			2.286	2.101	1.960

B- Moisture Calculations :-

Weight of wet soil+container (g)	250.0	250.0	250.0	250.0	250.0
Weight of dry soil+container (g)	245.5	243.0	236.0	229.0	223.0
Weight of container (g)	30.0	33.0	27.0	30.0	30.0
moisture content(%)	2.1	3.3	6.7	10.6	14.0

C - Dry density-Moisture relationship:-



M.D.D = 2.155 g/cm³
O.M.C = 6.60 %





COMIBASSAL International Controllers

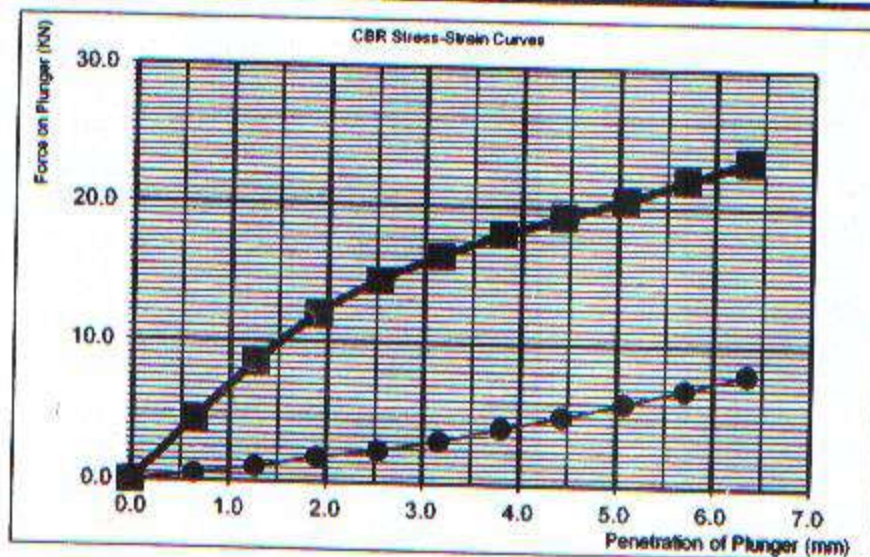
Internal inspection and laboratories sector

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Report Of CBR Test - ASTM - D 1883

NO OF BLOWS	56				
MOULD NO	1				
WT OF MOULD+SOIL	10945				
WT OF MOULD	5890				
WT OF SOIL	5055				
VOLUME OF MOULD	2200				
WET DENSITY	2.298				
MC before soaking		Weight of Rammer		4.54Kg	
TIN NO	1		MDD	Kg/m3	2.155
WT OF WET SOIL+TIN	250.00				
WT OF DRY SOIL+TIN	234		OMC	%	6.6
WT OF WATER	16.00				
WT OF TIN	31				
WT OF DRY SOIL	203				
MOISTURE CONTENT	7.9				
DRY DENSITY	2.130				

Pen	Reading (Div)	Bearing (KN)	CBR
mm	56	56	standar
0.00	0	0.0	0.0
0.64	55	0.5	4.5
1.27	110	1.1	8.5
1.91	190	1.9	12.0
2.54	245	2.4	14.5
3.17	320	3.1	16.3
3.81	420	4.1	18.0
4.45	510	5.0	19.3
5.08	610	6.0	20.5
5.71	710	7.0	21.9
6.35	820	8.0	23.3



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Report	:	388 - 1 - Center
Date	:	24/06/2023

CHEMICAL ANALYSIS

General Consultant : SYSTRA
Consultant : Dr/ Khaled Kandil
Contractor : شركة علام الدين وشركاه للمقاولات المتكاملة
Project : Electric express train
Sample : FERMA
Station : ST(334 +500)
Date of Test : 20-8-2023
Temperature : 28 °C
Humidity : 35%

ANALYSIS	RESULTS	METHOD REFERENCE
ORGANIC MATTER	NEGATIVE	ASTM D 2974



LAB DIRECTOR
CH/ Mostafa Asker
Moustaf

MATERIAL APPROVAL REQUEST



Contractor Company	ALADDIN(5)		Designer Company	(K.K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. MAHMOUD DIAB	<i>Mahmoud Diab</i>	02/10/2023	10:00							
			S5 -A-AD-5 -M.A.R. QT - 02								
Received by GARB CONSULTANT	Eng. SAIED SAIF	<i>SAIED SAIF</i>	MAR	C1	C2	C3	DD	MM	YY	HH	MM
				334	EW	CS	3	10	23	10	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	Fill Layer Total Quantity(1000 m3)		
Location to be Used	المشور		
Sample only	Yes	Materials Type	fill layers
Supplier Name		Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	
Comments by: Eng.khaled Zaki (k.k)		Comments by: Eng. Alaa Abd-Allatif (ER)	
QUALITY TEST RESULT IS APPROVED		1- one sample was selected for quality test 2- All tests were carried - out by CEL Lab . 3- results attached and found acceptable and comply with proj. specs. 4- final approval is subject to above mentioned comments 5-The original copy is attached to (S5 -A-AD-2 -M.A.R. QT - 02)	

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng.Mahmoud Diab	<i>Mahmoud Diab</i>		A
QA/QC *	Eng. SAIED SAIF	<i>SAIED SAIF</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa Abd-Allatif</i>	16-10-2023	AWC

* Designer

** Alignment/Bridges: Curven only

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

Dear Gentleman,

Attached here with the Soil Embankment delivered on 03/10/2023

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 client to our laboratory brought the sample and the laboratory is not responsible for the way it is taken.

Signature /...02...
المركز الرئيسي : شارع الملك الأفصل - الزمالة - القاهرة
مكتب معامل الاستشارات الهندسية

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

RESULTS OF SIEVE ANALYSIS According to ASTM D-C 136

Sieve Size (mm)	Passing %
50	100
37.5	96.6
25	89.3
19	74.6
12.50	67.2
9.50	59.4
4.75	51.4
2.36	46.2
2.00	43.7
1.18	38.9
0.600	34.1
0.425	28.7
0.300	21.3
0.150	18.6

Signature



Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

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

Test	Results (%)
Percentage of material finer than Sieve Size 75 μ m (No.200)	10.9

Signature /
مكتب معامل الاستشارات الهندسية
02
الاستشاري /
البريد الإلكتروني: info@cel-egypt.com

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

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

Test	Results (%)
Liquid Limit	NP
Plastic Limit	NP
Plasticity Index	NP

CEL
مكتب معامل الاستشارات الهندسية
Signature: السيد المهندس
البروفيسور الدكتور أحمد محمد أحمد

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

Soil Classification According to Project Specs (Embankment)

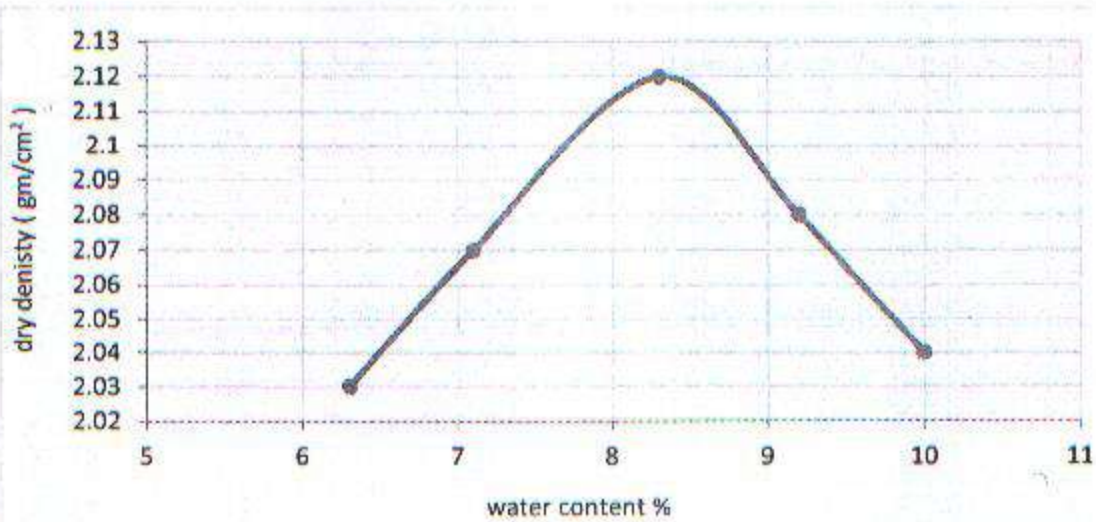
TEST	Results (%)	Limits according Projects Specs	
Group Classification	(A-1-a)	(A-1-a)	(A-1-b)
2.00 mm (No.10).	43.7	Max 50 %	-----
0.425 mm (No. 40).	28.7	Max 30 %	Max 50 %
0.075 mm (No. 200).	10.9	Max 15 %	Max 15 %
Characteristics of fraction passing 0.425 mm (No.40)			
Liquid Limit	NP	-----	-----
Plasticity index	NP	Max 6 %	Max 6 %

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

Signature
مكتب معامل الاستشارات الهندسية
.....
المركز الرئيسي : شارع الملك الأفضل - الزمالة - القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

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



- Max dry density (gm/cm³) : 2.12
- Optimum moisture content % : 8.3

Signature: 
02
مكتب معامل الاستشارات الهندسية
شارع الملك الأفضل، القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
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	1.17
1.27	0.050	1.86
1.91	0.075	2.51
2.54	0.100	3.04
3.18	0.125	3.52
3.81	0.150	3.98
4.45	0.175	4.38
5.08	0.200	4.76
5.71	0.225	5.01
6.35	0.250	5.34

CBR Result	Stress (Mpa)		CBR %
At 0.1 inch (2.54 mm) penetration	St. Value	Sample results	44.1
	6.90	3.04	

Notes :

- 1- Attached graph shows penetration resistance versus penetration magnitude.
- 2- The sample was compacted to dry density of 2.12 (gm /cm³) at 8.3 % optimum water content.
- 3- Surcharge load 450 Kg.

Signature

02

مكتب معامل الاستشارات الهندسية
المساحل الشامية
الرقم الرئيسي : شارع النيل الأطلال - الزمالة - القاهرة

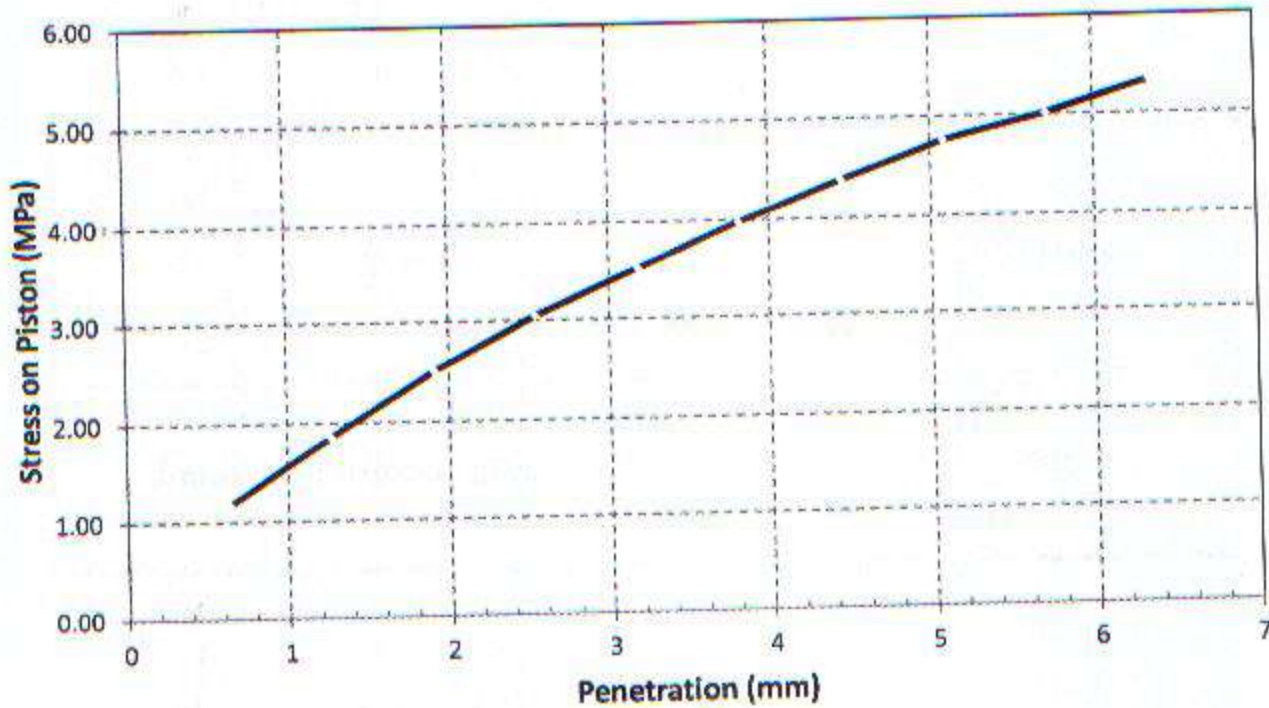
3 El Malek El Afdal Street
Zamalek, Cairo.
Tel. & Fax : 27367231 - 27363093



3 ش الملك الأفصل
الزمالة - القاهرة
تليفون + فاكس : ٢٧٣٦٧٢٣١ - ٢٧٣٦٣٠٩٣
www.cel-egypt.com

Company Name : علاء الدين و شركاه للقرات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

Load Penetration Curve of CBR Test
ASTM D-1883



CEL
مكتب معاميل الإستشارات الهندسية
الساحل الشمالي
02
Signature /

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 03/10/2023
Reporting Date : 16/10/2023
Reporting No. : 04
Sample No. : 04

Organic of Soil ASTM D-2974
Method Type D

Test	Results
Amount of organic content %	Nil

Signature / **CEL**
مكتب معامل الاستشارات الهندسية
الساحل الشمالي 02
البريد الإلكتروني : info@cel-egypt.com

MATERIAL APPROVAL REQUEST



Contractor Company	ALADDIN(5)			Designer Company	(K.K) Engineering Consulting Office						
Issued by Contractor	Name	Sign		Date/Serial Number	Time						
	Eng. MAHMOUD DIAB	<i>maumad</i>		14/10/2023 S5 -A-AD-5 -M.A.R. QT - 03	10:00						
Received by GARB CONSULTANT	Eng. SAIED SAIF	<i>SA</i>	MAR	C1	C2	C3	DD	MM	YY	HH	MM
				334	EW	CS	15	10	23	10	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	Fill Layer Total Quantity(1500 m3)		
Location to be Used	العشون		
Sample only	Yes	Materials Type	fill layers
Supplier Name		Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41 2) VERSION 2 GIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	

Comments by: Eng.khaled Zaki (k.k)	Comments by: Eng. Alaa Abd-Allatif (ER)
QUALITY TEST RESULT IS APPROVED	1- one sample was selected for quality test 2- All tests were carried - out by CEL Lab . 3- results attached and found acceptable and comply with proj. specs. 4- final approval is subject to above mentioned comments 5-The original copy is attached to (S5 -A-AD-2-M.A.R. QT - 03)

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng.Mahmoud Diab	<i>maumad</i>		A
QA/QC *	Eng. SAIED SAIF	<i>SA</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa</i>	26-10-2023	Awc

* Designer

** Alignment/Bridges: Culvert only

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

Dear Gentleman,

Attached here with the Soil Embankment delivered on 15/10/2023

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 client to our laboratory brought the sample and the laboratory is not responsible for the way it is taken.

Signature / 

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

RESULTS OF SIEVE ANALYSIS According to ASTM D-C 136

Sieve Size (mm)	Passing %
50	100
37.5	97.5
25	84.0
19	77.8
12.50	67.5
9.50	63.1
4.75	60.8
2.36	53.6
2.00	48.9
1.18	43.6
0.600	38.9
0.425	33.4
0.300	24.6
0.150	19.6

CEL
مكتب معامل الاستشارات الهندسية
Signature:
المساحل الشما
المركز الرئيسي * شارع النيل - الزمالة - القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

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

Test	Results (%)
Percentage of material finer than Sieve Size 75 μ m (No.200)	11.7

Signature
مكتب معامل الاستشارات الهندسية
السيد جمال السيد
المرکز الرئيسي : شارع الملك الأفصل - القاهرة - الجيزة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

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

Test	Results (%)
Liquid Limit	NP
Plastic Limit	NP
Plasticity Index	NP



Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

Soil Classification According to Project Specs (Embankment)

TEST	Results (%)	Limits according Projects Specs	
		(A-1-a)	(A-1-b)
Group Classification	(A-1-a)	(A-1-a)	(A-1-b)
2.00 mm (No.10).	48.9	Max 50 %	-----
0.425 mm (No. 40).	33.4	Max 30 %	Max 50 %
0.075 mm (No. 200).	11.7	Max 15 %	Max 15 %
Characteristics of fraction passing 0.425 mm (No.40)			
Liquid Limit	NP	-----	-----
Plasticity index	NP	Max 6 %	Max 6 %

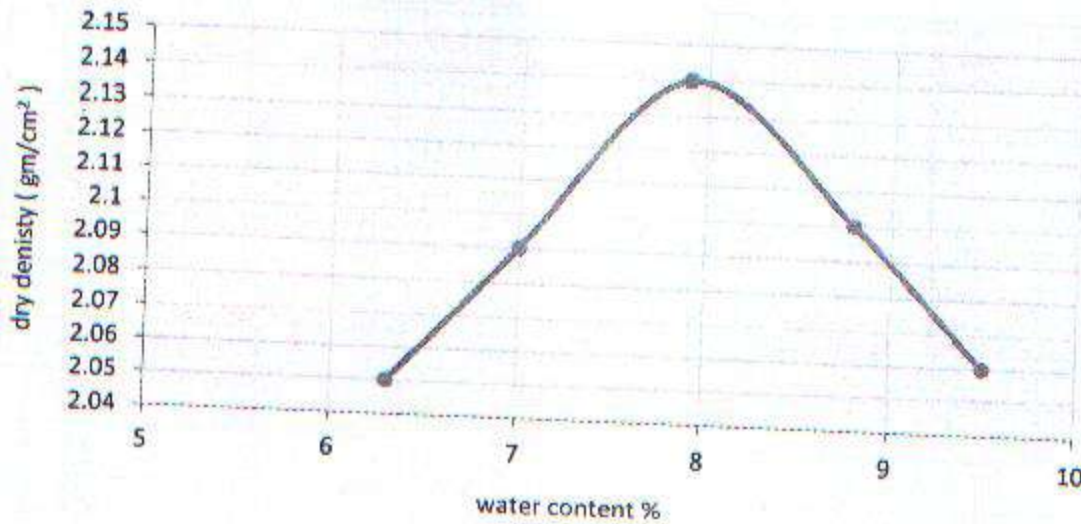
The test results are (☒ Comply - ☐ Not Comply) with specifications limits

Signature

مكتب معامل الاستشارات الهندسية
علاء الدين و شركاه
الرئيس: علاء الدين و
شارع الملك الأفضل - الزمالك - القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

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



- Max dry density (gm/cm³) : 2.12
- Optimum moisture content % : 8.1

Signature: 
مكتب معامل الاستشارات الهندسية
الشارع الثالث 02
البريد الإلكتروني: info@cel-egypt.com

Company Name : علاء الدين و شركاه للمقاولات المتكاملة :
 Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
 Type of sample : Soil Embankment
 Location : St. 334+000
 Delivery Date : 15/10/2023
 Reporting Date : 26/10/2023
 Reporting No. : 06
 Sample No. : 06

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

penetration		stress on piston (Mpa)
mm	Inch	
0.64	0.025	1.34
1.27	0.050	1.55
1.91	0.075	1.83
2.54	0.100	2.10
3.18	0.125	2.47
3.81	0.150	2.72
4.45	0.175	2.98
5.08	0.200	3.32
5.71	0.225	3.67
6.35	0.250	3.98

CBR Result	Stress (Mpa)		CBR %
At 0.1 inch (2.54 mm) penetration	St. Value	Sample results	30.5
	6.90	2.10	

Notes :

- 1- Attached graph shows penetration resistance versus penetration magnitude.
- 2- The sample was compacted to dry density of 2.12 (gm /cm³) at 8.1 % optimum water content.

3- Surcharge load 4.50 Kgs

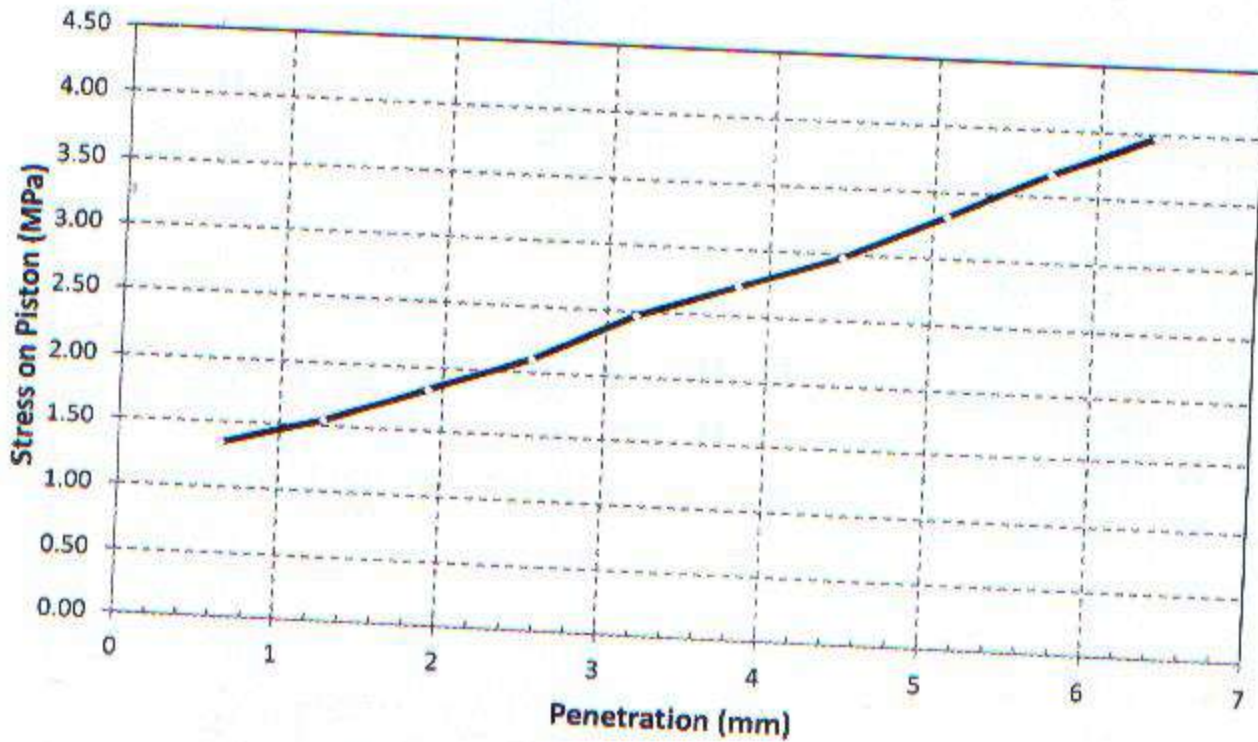
Signature /

المساحم الشمالى 02

.....

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Delivery Date : 15/10/2023
Reporting Date : 26/10/2023
Reporting No. : 06
Sample No. : 06

Load Penetration Curve of CBR Test ASTM D-1883



Signature /
المهندس /
المركز الرئيسي : شارع الملك الأفندي - القاهرة

MATERIAL APPROVAL REQUEST



Contractor Company	ALADDIN(5)		Designer Company	(K.K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. MAHMOUD DIAB	<i>Mahmoud Diab</i>	2/12/2023 S5 -A-AD-5 -M.A.R. QT - 04	10:00							
Received by GARB CONSULTANT	Eng. SAIED SAIF	<i>[Signature]</i>	MAR	C1	C2	C3	DD	MM	YY	HH	MM
				334	EW	CS	6	12	23	10	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	Fill Layer Total Quantity(1500 m3)		
Location to be Used	المشور		
Sample only	Yes	Materials Type	fill layers
Supplier Name		Data Sheet provided	Yes attached
Reference in BoQ		Specification	EARTHWORK SPECIFICATIONS & TESTING REPORT (CG21-41.2) VERSION 2 CIVECON GROUP
Prequalification reference		Test Samples Results	
Reference Photos	No/Yes	Other	

Comments by: Eng.khaled Zaki (k.k)	Comments by: Eng. Alaa Abd-Allatif (ER)
QUALITY TEST RESULT IS APPROVED	1- one sample was selected for quality test 2- All tests were carried - out by CEL Lab . 3- results attached and found acceptable and comply with proj. specs. 4- final approval is subject to above mentioned comments 5-The original copy is attached to (S5 -A-AD-3 -M.A.R. QT - 05)

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng.Mahmoud Diab	<i>Mahmoud Diab</i>		A
QA/QC *	Eng. SAIED SAIF	<i>[Signature]</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>[Signature]</i>	19-12-2023	Awc

* Designer

** Alignment/Bridges: Culvert only

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

Dear Gentleman,

Attached here with the Soil Embankment delivered on 25/10/2023

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 client to our laboratory brought the sample and the laboratory is not responsible for the way it is taken.

Signature  02

Company Name : علاء الدين و شركاه للمقاولات المتكاملة :
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

RESULTS OF SIEVE ANALYSIS According to ASTM D-C 136

Sieve Size (mm)	Passing %
50	100
37.5	99.2
25	91.2
19	81.2
12.50	71.4
9.50	62.3
4.75	54.1
2.36	49.8
2.00	46.2
1.18	41.2
0.600	34.9
0.425	28.2
0.300	23.4
0.150	18.9

مكتب معامل الإستشارات الهندسية
المساكنة - القاهرة
02
Signature /

Company Name : علام الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

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

Test	Results (%)
Percentage of material finer than Sieve Size 75 μ M (No.200)	9.8

CEL
مكتب معامل الاستشارات الهندسية
التميز حاصل
Signature 02
المرشد الرئيسي : شارة عبد الله - الأفاضل : الزمالة : جلال

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

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

Test	Results (%)
Liquid Limit	NP
Plastic Limit	NP
Plasticity Index	NP

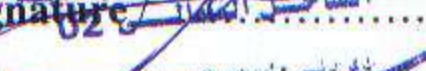

مكتب معامل الاستشارات الهندسية
...العميل تمسلي الاستشارات الهندسية
02
برك النوريس - شبرا الخيمة - الأهرام - القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

Soil Classification According to Project Specs (Embankment)

TEST	Results (%)	Limits according Projects Specs	
		(A-1-a)	(A-1-b)
Group Classification	(A-1-a)	(A-1-a)	(A-1-b)
2.00 mm (No.10).	46.2	Max 50 %	-----
0.425 mm (No. 40).	28.2	Max 30 %	Max 50 %
0.075 mm (No. 200).	9.8	Max 15 %	Max 15 %
Characteristics of fraction passing 0.425 mm (No.40)			
Liquid Limit	NP	-----	-----
Plasticity index	NP	Max 6 %	Max 6 %

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

Signature:  
مكتب معامل الاستشارات الهندسية
العلاء الدين و شركاه للمقاولات المتكاملة
شارع الملك الأفصل - القاهرة

5

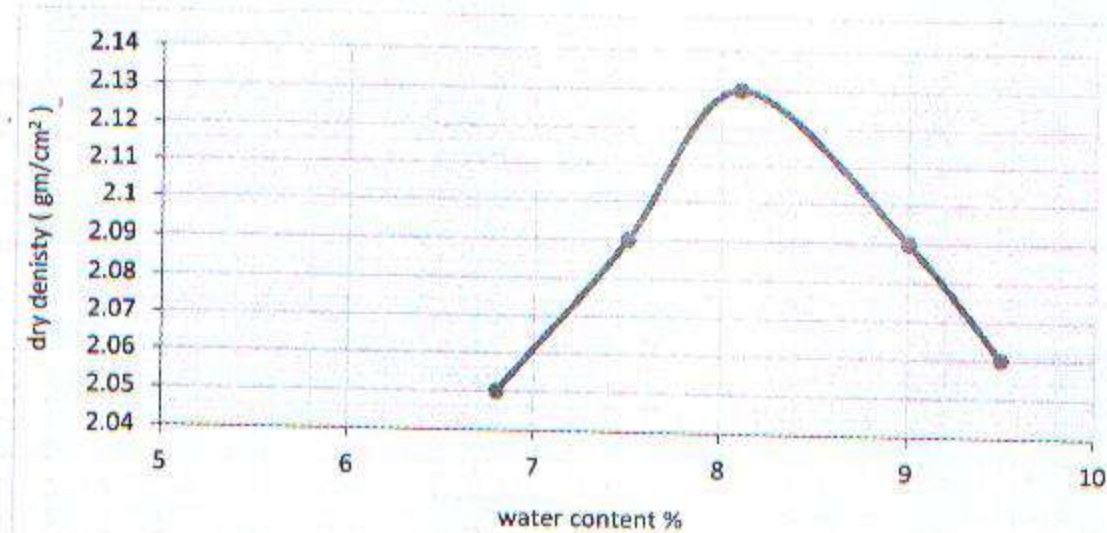
3 El Malek El Afdal Street
Zamalek, Cairo.
Tel.& Fax : 27367231 - 27363093



ش الملك الأفصل
الزمالك - القاهرة
تليفون + فاكس : ٢٧٣٦٧٢٣١ - ٢٧٣٦٣٠٩٣
www.cel-egypt.com

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

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



- Max dry density (gm/cm³) : 2.13
- Optimum moisture content % : 8.1

Signature: 
02
مكتب معامل الاستشارات الهندسية
المعامل الشمالية 02
بني سويف - شارع الملك الأفندي

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

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

penetration		stress on piston (Mpa)
mm	Inch	
0.64	0.025	2.12
1.27	0.050	2.69
1.91	0.075	3.16
2.54	0.100	3.49
3.18	0.125	3.84
3.81	0.150	4.18
4.45	0.175	4.50
5.08	0.200	4.86
5.71	0.225	5.23
6.35	0.250	5.56

CBR Result	Stress (Mpa)		CBR %
At 0.1 inch (2.54 mm) penetration	St. Value	Sample results	50.6
	6.90	3.49	

Notes :

- 1- Attached graph shows penetration resistance versus penetration magnitude.
- 2- The sample was compacted to dry density of 2.13 (gm /cm³) at 8.1 % optimum water content.

Surcharge load 4.50 Kg/cm²

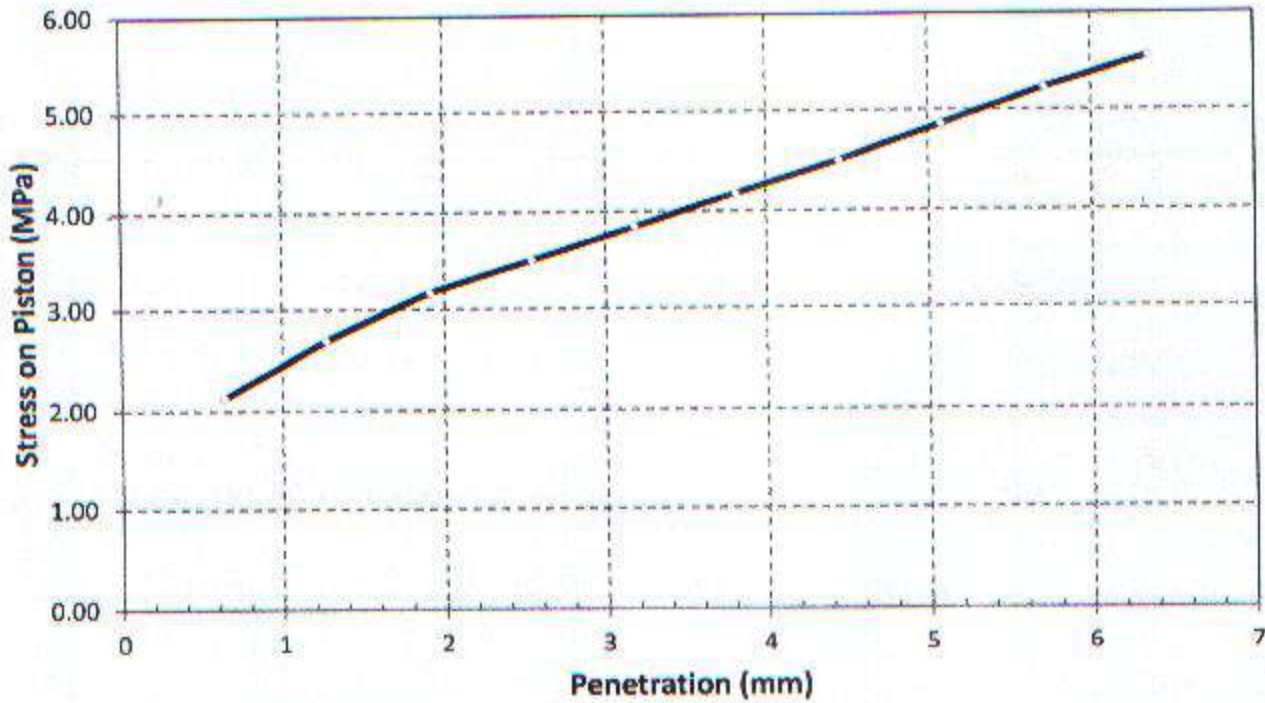
Signature

.....

.....

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

Load Penetration Curve of CBR Test
ASTM D-1883



Signature

CEL
مكتب معامل الاستشارات الهندسية
التمثيل القانوني
02
شركة برنيس - شارع الملك الحسن الثاني - القاهرة

Company Name : علاء الدين و شركاه للمقاولات المتكاملة
Project : Electric Express Train, from Al Ain Sokhna to Marsa Matrouh
Type of sample : Soil Embankment
Location : St. 334+000
Reporting Date : 03/12/2023
Reporting Date : 19/12/2023
Reporting No. : 09
Sample No. : 09

Organic of Soil ASTM D-2974

Method Type D

Test	Results
Amount of organic content %	Nil

CEL
مكتب معامل الاستشارات الهندسية
Signature:
الساحل الشاذلي
بوكى بوليس - شارع الملك الأفضل - الزمالة - القاهرة

MATERIAL INSPECTION REQUEST



Contractor Company	ALADDIN(05)		Designer Company	(K - K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Mahmoud Diab	<i>Mahmoud Diab</i>	05/08/2023 S5 -A-AD-5-P.L.T (01)	1:00 PM							
Received by GARB CONSULTANT	Eng. Saied Saif	<i>Saied Saif</i>	MIR	C1	C2	C3	DD	MM	YY	HH	MM
				334	EW	CS	6	8	23	1	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	CUT BED				
Location to be Used	From	335+000	TO	335+060	
MAR & UIR Approval No	UIR S5 -A-AD-5 -C-01	Date	02/08/2023		
	M.A.R. Q.T.-C-01		29/07/2023		
Supplier Name					
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	1		
2					
3					
4					

Comments by: Eng. Saied Saif (K.K)	Comments by: Eng. Alaa Abd-Allatif (ER)
1-The Plate Load Test Result P.L.T.(DIN 18134) is Approved.	1-P.L.T was carried- out by civil engineering testing & consulting unit (Egypt.Japan University of Science and Technology) 2-Results report attached and found acceptable and comply with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mahmoud Diab	<i>Mahmoud Diab</i>		A
QA/QC *	Eng. Saied Saif	<i>Saied Saif</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa Abd-Allatif</i>	1-8-2023	AWC



Technical Report

Plate Loading Tests

KM 334+840, KM 334+940,
KM 335+057, KM 334+500,
and KM 334+560

Native Soil

Project

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

Prepared for

Aladdin and Partners Integrated Contracting

El khalig El masri Street, Hadayek El Kobba -149

يعتمد
أمين عام الجامعة
لواء مهلاس / أسامة فتحي

(August 6, 2023)





1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by Aladdin and Partners Integrated Contracting to conduct 5 plate loading tests on the Native Soil of the Electric Express Train project at 5 locations (KM 334+840, KM 334+940, KM 335+057, KM 334+500, and KM 334+560) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Rabiee Roshdy of Aladdin and Partners Integrated Contracting. 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 5 points (KM 334+840, KM 334+940, KM 335+057, KM 334+500, and KM 334+560). 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 966E.





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/m² was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². 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. 5 plate loading tests on the Native Soil of the Electric Express Train project were conducted at 5 locations (KM 334+840, KM 334+940, KM 335+057, KM 334+500, and KM 334+560) and the data collected at the 5 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 334+840, 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 334+840)

loading stage	Load (F) kN	Normal MN/m ²	Settlement mm
0	1.414	0.005	0.00
1	7.07	0.025	0.23
2	14.14	0.050	0.33
3	21.21	0.075	0.40
4	28.28	0.100	0.48
5	35.35	0.125	0.60
6	42.42	0.150	0.69
7	49.49	0.175	0.81
8	56.56	0.200	0.93
9	63.63	0.225	1.03
10	70.7	0.250	1.14
11	56.56	0.200	1.11
12	49.49	0.175	1.04
13	35.35	0.125	0.90
14	21.21	0.075	0.75
15	1.414		0.04

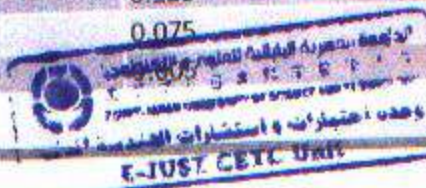




Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 334+840)

Loading stage	Load (F)	Normal stress (σ_v)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.04
1	7.07	0.025	0.30
2	14.14	0.050	0.39
3	21.21	0.075	0.52
4	28.28	0.100	0.59
5	35.35	0.125	0.70
6	42.42	0.150	0.81
7	49.49	0.175	0.90
8	56.56	0.200	0.95
9	63.63	0.225	1.03

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 334+840) 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 334+940) is provided in Tables 4-6 and Figure 2. The testing data corresponding to the third testing point (KM 335+057) is provided in Tables 7-9 and Figure 3. The testing data corresponding to the fourth testing point (KM 334+500) is provided in Tables 10-12 and Figure 4. The testing data corresponding to the fifth testing point (KM 334+560) is provided in Tables 13-15 and Figure 5.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 334+840)

Parameters	1st loading cycle	2nd loading cycle
$(s_{0,max})$ MN/m ²	0.25	0.25
s_0 (mm)	0.15	0.07
a_1 (mm/(MN/m ²))	3.11	6.44
a_2 (mm/(MN ² /m ⁴))	3.52	-10.02
$E_p = 1.5 p (a_1 + a_2 \cdot s_{0,max})$	112.77	114.44
E_v/E_p	1.01	



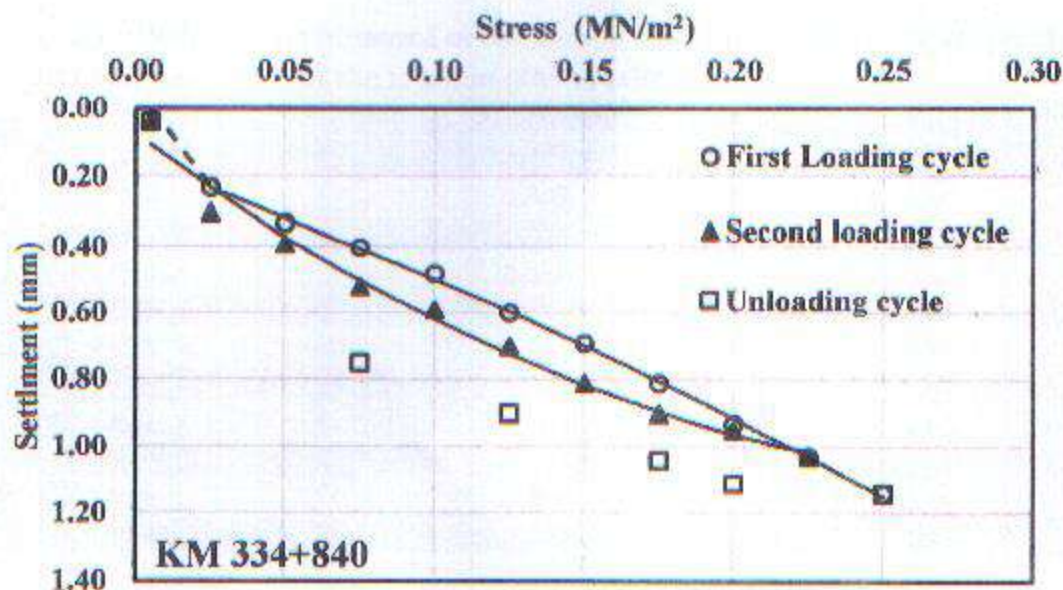


Figure 1: Load-settlement data: plate loading test performed at (KM 334+840)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 334+940)

Loading stage	Load (F)	Normal stress (σ_c)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.33
2	14.14	0.050	0.40
3	21.21	0.075	0.51
4	28.28	0.100	0.63
5	35.35	0.125	0.72
6	42.42	0.150	0.85
7	49.49	0.175	0.96
8	56.56	0.200	1.08
9	63.63	0.225	1.27
10	70.7	0.250	1.36
11	56.56	0.200	1.31
12	49.49	0.175	1.25
13	35.35	0.125	1.08
14	21.21	0.075	0.93
15	1.414	0.005	0.06





Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 334+940)

Loading stage	Load (F) kN	Normal stress (σ_v) MN/m ²	Settlement (S) mm
0	1.414	0.005	0.06
1	7.07	0.025	0.40
2	14.14	0.050	0.51
3	21.21	0.075	0.66
4	28.28	0.100	0.79
5	35.35	0.125	0.92
6	42.42	0.150	1.00
7	49.49	0.175	1.13
8	56.56	0.200	1.28
9	63.63	0.225	1.34

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 334+940)

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_v)_{max}$ (MN/m ²)	0.25	0.25
s_0 (mm)	0.24	0.11
a_1 (mm/(MN/m ²))	3.29	7.92
a_2 (mm/(MN ² /m ³))	5.09	-11.24
$E_v = 1.5 \pi / (a_1 + a_2 \cdot s_0 \cdot \sigma_v)$	98.69	88.01
E_v/E_{v1}	0.89	

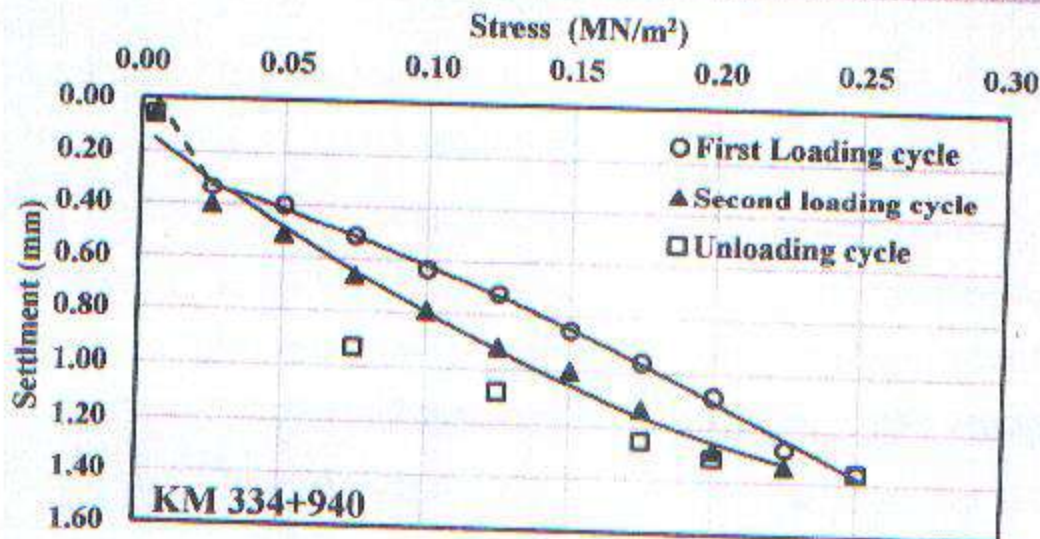


Figure 2: Load-settlement data: plate loading test performed at (KM 334+940)



Table 7: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 335+057)

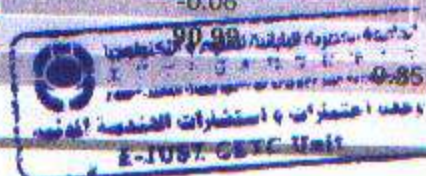
Loading stage	Load (F)	Normal stress (σ_v)	Settlement (S)
	kN	MM/m ²	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.35
2	14.14	0.050	0.54
3	21.21	0.075	0.69
4	28.28	0.100	0.75
5	35.35	0.125	0.85
6	42.42	0.150	1.00
7	49.49	0.175	1.13
8	56.56	0.200	1.26
9	63.63	0.225	1.37
10	70.7	0.250	1.51
11	56.56	0.200	1.46
12	49.49	0.175	1.40
13	35.35	0.125	1.23
14	21.21	0.075	1.02
15	1.414	0.005	0.08

Table 8: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 335+057)

Loading stage	Load (F)	Normal stress (σ_v)	Settlement (S)
	kN	MM/m ²	mm
0	1.414	0.005	0.08
1	7.07	0.025	0.40
2	14.14	0.050	0.55
3	21.21	0.075	0.76
4	28.28	0.100	0.89
5	35.35	0.125	1.00
6	42.42	0.150	1.21
7	49.49	0.175	1.34
8	56.56	0.200	1.41
9	63.63	0.225	1.49

Table 9: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 335+057)

Parameters	1st loading cycle	2nd loading cycle
$(s_{0.05})_{max}$ (mm)	0.25	0.25
a_1 (mm/(MN/m ²))	0.26	0.09
a_2 (mm/(MN/m ²))	4.96	9.68
a_3 (mm/(MN/m ²))	-0.06	-15.48
$E_v = 1.5 \pi (a_1 + a_2 s_{0.05} + a_3 s_{0.05}^2)$		77.39
E_{v1}/E_{v2}		



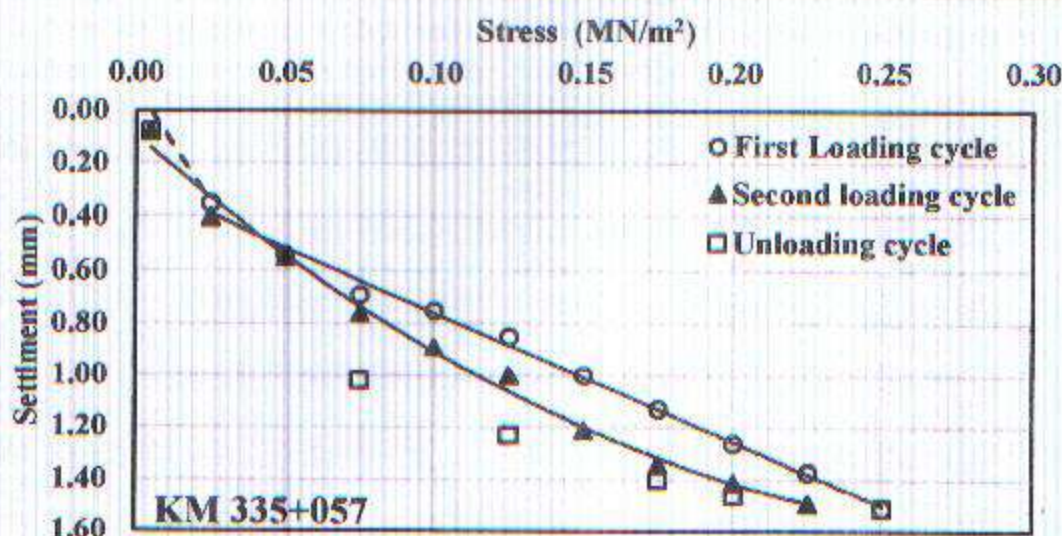


Figure 3: Load-settlement data: plate loading test performed at (KM 335+057)

Table 10: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 334+500)

Loading stage	Load (F)	Normal stress (σ)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.31
2	14.14	0.050	0.38
3	21.21	0.075	0.57
4	28.28	0.100	0.69
5	35.35	0.125	0.86
6	42.42	0.150	1.04
7	49.49	0.175	1.27
8	56.56	0.200	1.45
9	63.63	0.225	1.65
10	70.7	0.250	1.84
11	56.56	0.200	1.79
12	49.49	0.175	1.73
13	35.35	0.125	1.61
14	21.21	0.075	1.46
15	1.414	0.005	0.55

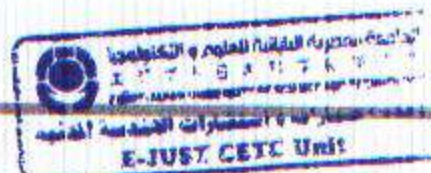




Table 11: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 334+500)

Loading stage	Load (F)	Normal stress (σ_p)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.55
1	7.07	0.025	0.79
2	14.14	0.050	0.98
3	21.21	0.075	1.20
4	28.28	0.100	1.37
5	35.35	0.125	1.56
6	42.42	0.150	1.75
7	49.49	0.175	1.88
8	56.56	0.200	1.96
9	63.63	0.225	2.00

Table 12: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 334+500)

Parameters	1st loading cycle	2nd loading cycle
($s_{p,max}$) MN/m ²	0.25	0.25
a_0 (mm)	0.16	0.50
a_1 (mm/(MN/m ²))	4.59	10.83
a_2 (mm/(MN ² /m ⁴))	8.85	-17.88
$E_v = 1.5 / (a_1 + a_2 \sigma_p)$	66.12	70.78
E_v/E_{v1}		1.07

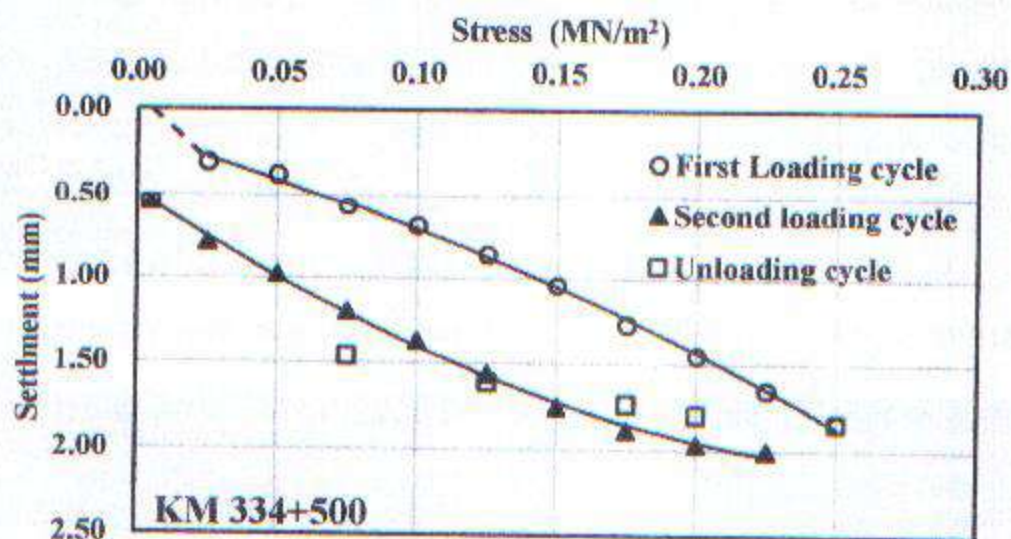


Figure 4: Load-settlement data: plate loading test performed at (KM 334+500)



Table 13: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 334+560)

Loading stage	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement (S) mm
0	1.414	0.005	0.00
1	7.07	0.025	0.38
2	14.14	0.050	0.49
3	21.21	0.075	0.57
4	28.28	0.100	0.69
5	35.35	0.125	0.83
6	42.42	0.150	0.98
7	49.49	0.175	1.14
8	56.56	0.200	1.29
9	63.63	0.225	1.46
10	70.7	0.250	1.58
11	56.56	0.200	1.58
12	49.49	0.175	1.54
13	35.35	0.125	1.36
14	21.21	0.075	1.17
15	1.414	0.005	0.30

Table 14: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 334+560)

Loading stage	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement (S) mm
0	1.414	0.005	0.30
1	7.07	0.025	0.55
2	14.14	0.050	0.70
3	21.21	0.075	0.85
4	28.28	0.100	0.97
5	35.35	0.125	1.12
6	42.42	0.150	1.24
7	49.49	0.175	1.36
8	56.56	0.200	1.44
9	63.63	0.225	1.53

Table 15: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 334+560)

Parameters	1st loading cycle	2nd loading cycle
$(\sigma_{v, \max})$ (MN/m ²)	0.25	0.25
σ_0 (mm)	0.27	0.31
a_1 (mm/(MN/m ²))	3.72	8.03
a_2 (mm/(MN ² /m ²))	6.49	-11.69
$E_{vr} = 1.5 \cdot (a_1 + a_2 \cdot \sigma_{v, \max})$	84.28	88.14
E_{vr}/E_v	1.05	



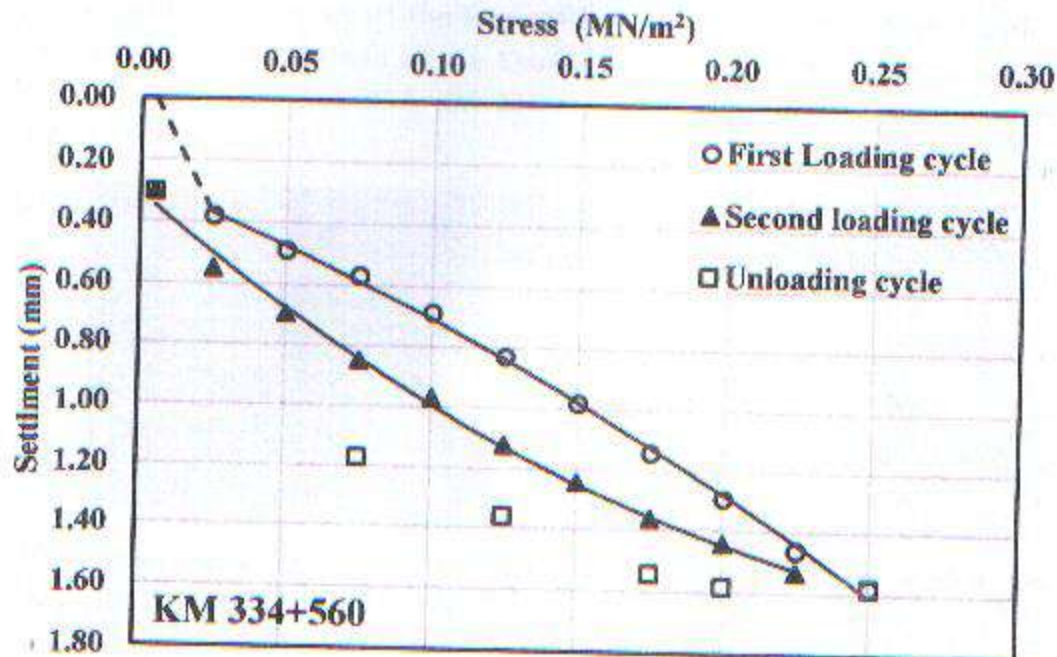


Figure 5: Load-settlement data: plate loading test performed at (KM 334+560)



4. Closure

Test results presented herein report the load-settlement data obtained from 5 plate loading tests conducted on the Native Soil of the Electric Express train project at 5 locations (KM 334+840, KM 334+940, KM 335+057, KM 334+500, and KM 334+560) in accordance with German Standard, DIN18134.

Location	E_{v1} MN/m ²	E_{v2} MN/m ²	E_{v2}/E_{v1} ratio
KM 334+840	112.77	114.44	1.01
KM 334+940	98.69	88.01	0.89
KM 335+057	90.99	77.39	0.85
KM 334+500	66.12	70.78	1.07
KM 334+560	84.28	88.14	1.05

* 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 334+840		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	6/8/2023
Diameter of loading plate	600		Time	12:35:00 PM 1:02:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.77	
	2	14.14	9.67	
	3	21.21	9.60	
	4	28.28	9.52	
	5	35.35	9.40	
	6	42.42	9.31	
	7	49.49	9.19	
	8	56.56	9.07	
	9	63.63	8.97	
	10	70.7	8.86	
Unloading Stage	11	56.56	8.89	
	12	49.49	8.96	
	13	35.35	9.10	
	14	21.21	9.25	
	15	1.414	9.96	
	Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)
Reloading Stage	0	1.414	9.96	
	1	7.07	9.70	
	2	14.14	9.61	
	3	21.21	9.48	
	4	28.28	9.41	
	5	35.35	9.30	
	6	42.42	9.19	
	7	49.49	9.10	
	8	56.56	9.05	
	9	63.63	8.97	



Location of test site:	KM 334+940		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	6/8/2023
Diameter of loading plate	600		Time	1:07:00 PM 1:34:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.67	
	2	14.14	9.60	
	3	21.21	9.49	
	4	28.28	9.37	
	5	35.35	9.28	
	6	42.42	9.15	
	7	49.49	9.04	
	8	56.56	8.92	
	9	63.63	8.73	
	10	70.7	8.64	
Unloading Stage	11	56.56	8.69	
	12	49.49	8.75	
	13	35.35	8.92	
	14	21.21	9.07	
	15	1.414	9.94	
	Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)
Reloading Stage	0	1.414	9.94	
	1	7.07	9.60	
	2	14.14	9.49	
	3	21.21	9.34	
	4	28.28	9.21	
	5	35.35	9.08	
	6	42.42	9.00	
	7	49.49	8.87	
	8	56.56	8.72	
	9	63.63	8.66	

Location of test site:	KM 335+057		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	6/8/2023
Diameter of loading plate	600		Time	1:39:00 PM
Lever ratio	1			2:06:00 PM
Type of Soil	Native Soil		Note: CAT 966E	
Bedding material	---			
Temperature	33°C			
Test regime	Loading Stage No.		Dial Gauge Reading (mm)	
Loading Stage	0	1.414	10.00	
	1	7.07	9.65	
	2	14.14	9.46	
	3	21.21	9.31	
	4	28.28	9.25	
	5	35.35	9.15	
	6	42.42	9.00	
	7	49.49	8.87	
	8	56.56	8.74	
	9	63.63	8.63	
	10	70.7	8.49	
Unloading Stage	11	56.56	8.54	
	12	49.49	8.60	
	13	35.35	8.77	
	14	21.21	8.98	
	15	1.414	9.92	
Test regime	Loading Stage No.		Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.92	
	1	7.07	9.60	
	2	14.14	9.45	
	3	21.21	9.24	
	4	28.28	9.11	
	5	35.35	9.00	
	6	42.42	8.79	
	7	49.49	8.66	
	8	56.56	8.59	
	9	63.63	8.51	



Location of test site:	KM 334+500		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	6/8/2023
Diameter of loading plate	600		Time	2:11:00 PM 2:38:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.69	
	2	14.14	9.62	
	3	21.21	9.43	
	4	28.28	9.31	
	5	35.35	9.14	
	6	42.42	8.96	
	7	49.49	8.73	
	8	56.56	8.55	
	9	63.63	8.35	
	10	70.7	8.16	
Unloading Stage	11	56.56	8.21	
	12	49.49	8.27	
	13	35.35	8.39	
	14	21.21	8.54	
	15	1.414	9.45	
	Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)
Reloading Stage	0	1.414	9.45	
	1	7.07	9.21	
	2	14.14	9.02	
	3	21.21	8.80	
	4	28.28	8.63	
	5	35.35	8.44	
	6	42.42	8.25	
	7	49.49	8.12	
	8	56.56	8.04	
	9	63.63	8.00	

Location of test site:	KM 334+560		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	6/8/2023
Diameter of loading plate	600		Time	2:43:00 PM 3:10:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.62	
	2	14.14	9.51	
	3	21.21	9.43	
	4	28.28	9.31	
	5	35.35	9.17	
	6	42.42	9.02	
	7	49.49	8.86	
	8	56.56	8.71	
	9	63.63	8.54	
Unloading Stage	10	70.7	8.42	
	11	56.56	8.42	
	12	49.49	8.46	
	13	35.35	8.64	
	14	21.21	8.83	
	15	1.414	9.70	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.70	
	1	7.07	9.45	
	2	14.14	9.30	
	3	21.21	9.15	
	4	28.28	9.03	
	5	35.35	8.88	
	6	42.42	8.76	
	7	49.49	8.64	
	8	56.56	8.56	
	9	63.63	8.47	

MATERIAL INSPECTION REQUEST



Contractor Company	ALADDIN(05)		Designer Company	(K - K) Engineering Consulting Office							
Issued by Contractor	Name	Sign	Date/Serial Number	Time							
	Eng. Mahmoud Diab	<i>Mahmoud Diab</i>	31/10/2023 S5 -A-AD-5-P.L.T (02)	1:00 PM							
Received by GARB CONSULTANT	Eng. Saied Saif	<i>Saied Saif</i>	MIR	C1	C2	C3	DD	MM	YY	HH	MM
				335	EW	CS	1	11	23	1	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	-1.5				
Location to be Used	From	335+000	TO	335+060	
MAR & UIR Approval No	UIR S5 -A-AD-5 -F-5		Date	30/10/2023	
	M.A.R. Q.T.-03			15/10/2023	
Supplier Name					
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	1		
2					
3					
4					

Comments by: Eng. Saied Saif (K.K)	Comments by: Eng. Alaa Abd-Allatif (ER)
1-The Plate Load Test Result P.L.T.(DIN 18134) is Approved.	1-P.L.T was carried- out by civil engineering testing & consulting unit (Egypt.Japan University of Science and Technology) 2-Results report attached and found acceptable and comply with project specifications. 3-Final approval is subject to above mentioned comments.

APPROVAL STATUS				
Organisation	Name	Sign	Date	A-AWC-R
Contractor	Eng. Mahmoud Diab	<i>Mahmoud Diab</i>		A
QA/QC *	Eng. Saied Saif	<i>Saied Saif</i>		A
GARB**	Eng. Margret Magdy			
Employers Representative	Eng. Alaa Abd-Allatif	<i>Alaa Abd-Allatif</i>	1-11-2023	Awc



Technical Report

Plate Loading Tests

KM 334+940 and KM 335+040

(Middle Embankment (-1.5 m))

Project

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

Prepared for

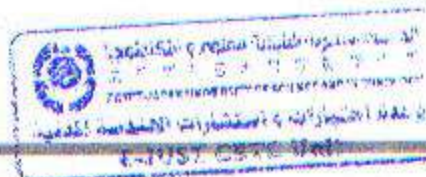
Aladdin and Partners Integrated Contracting

El khalig El masri Street, Hadayek El Kobba -149

(November 1, 2023)



مستند
إعداد
إدارة
الهندسة
المدنية
الجامعة
المصرية
اليابانية
للعلوم
والتكنولوجيا



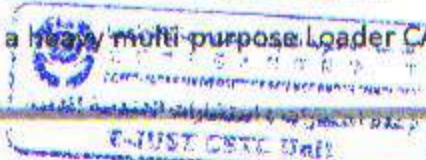


1. Introduction

The Civil Engineering Testing & Consulting Unit (CETCU) of the Egypt-Japan University of Science and Technology (EJUST) was retained by Aladdin and Partners Integrated Contracting to conduct two plate loading tests on the Middle Embankment (-1.5 m) of the Electric Express Train project at two locations (KM 334+940 and KM 335+040) in accordance with the German Standard DIN18134. The mandate was communicated by Eng. Rabiee Roshdy of Aladdin and Partners Integrated Contracting. 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 (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 334+940 and KM 335+040). 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 966E.





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/m² was applied. The load was increased in the first loading cycle until a normal stress of 0.25 MN/m² was reached, and the loading increment was 0.025 MN/m². 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 334+940 and KM 335+040) 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 334+940), 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 334+940)

Loading stage	Load (F)	Normal stress (σ_0)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.00
1	7.07	0.025	0.43
2	14.14	0.050	0.57
3	21.21	0.075	0.69
4	28.28	0.100	0.85
5	35.35	0.125	1.00
6	42.42	0.150	1.16
7	49.49	0.175	1.27
8	56.56	0.200	1.38
9	63.63	0.225	1.54
10	70.7	0.250	1.65
11	56.56	0.200	1.63
12	49.49	0.175	1.58
13	35.35	0.125	1.48
14	21.21	0.075	1.34
15	1.414	0.005	0.45

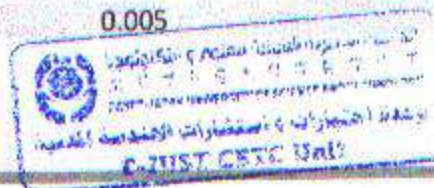




Table 2: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 334+940)

Loading stage	Load (F)	Normal stress (σ_0)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.45
1	7.07	0.025	0.84
2	14.14	0.050	0.93
3	21.21	0.075	1.00
4	28.28	0.100	1.14
5	35.35	0.125	1.25
6	42.42	0.150	1.35
7	49.49	0.175	1.46
8	56.56	0.200	1.54
9	63.63	0.225	1.59

The load-settlement data obtained in all loading and unloading stages for the test performed at the first location (KM 334+940) 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 335+040) is provided in Tables 4-6 and Figure 2.

Table 3: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 334+940)

Parameters	1st loading cycle	2nd loading cycle
($s_{0,max}$) MN/m ²	0.25	0.25
a_0 (mm)	0.27	0.53
a_1 (mm/(MN/m ²))	6.11	7.56
a_2 (mm/(MN ² /m ⁴))	-2.24	-12.87
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,max})$	81.14	103.48
Ev_2/Ev_1	1.28	



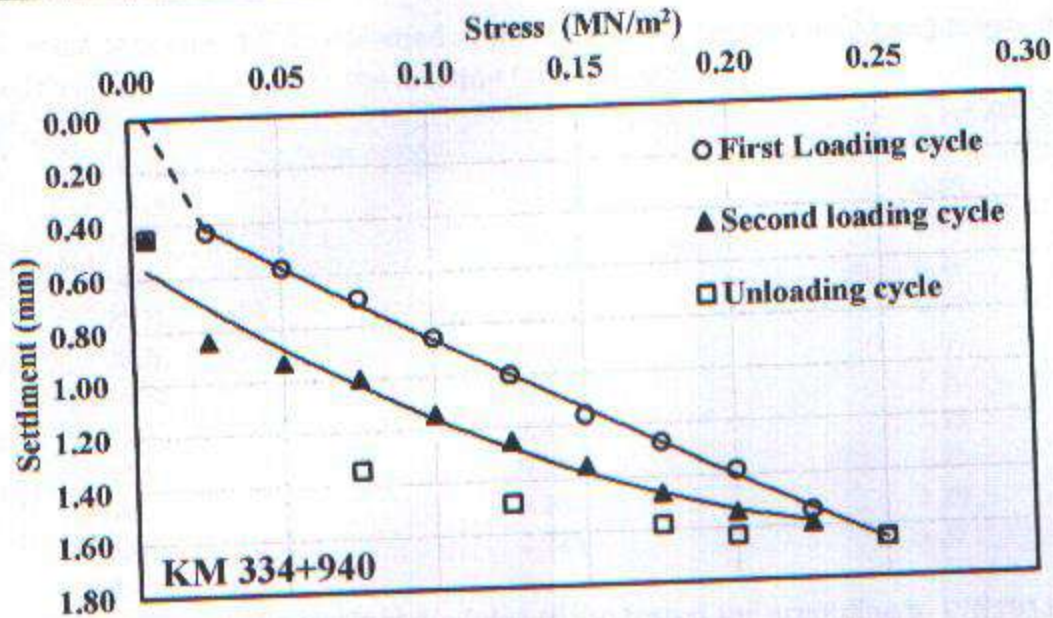


Figure 1: Load-settlement data: plate loading test performed at (KM 334+940)

Table 4: Load-settlement data obtained at the first loading and unloading stages of the plate loading test performed at the location (KM 335+040)

Loading stage	Load (F) kN	Normal stress (σ_0) MN/m ²	Settlement (S) mm
0	1.414	0.005	0.00
1	7.07	0.025	0.27
2	14.14	0.050	0.38
3	21.21	0.075	0.55
4	28.28	0.100	0.70
5	35.35	0.125	0.85
6	42.42	0.150	1.00
7	49.49	0.175	1.13
8	56.56	0.200	1.25
9	63.63	0.225	1.29
10	70.7	0.250	1.40
11	56.56	0.200	1.40
12	49.49	0.175	1.40
13	35.35	0.125	1.30
14	21.21	0.075	1.17
15	1.414	0.005	0.40

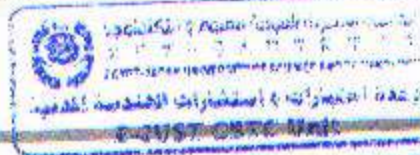




Table 5: Load-settlement data obtained at the second loading and unloading stages of the plate loading test performed at the location (KM 335+040)

Loading stage	Load (F)	Normal stress (σ_0)	Settlement (S)
	kN	MN/m ²	mm
0	1.414	0.005	0.40
1	7.07	0.025	0.62
2	14.14	0.050	0.79
3	21.21	0.075	0.90
4	28.28	0.100	1.00
5	35.35	0.125	1.10
6	42.42	0.150	1.19
7	49.49	0.175	1.25
8	56.56	0.200	1.29
9	63.63	0.225	1.33

Table 6: Calculations of the resilient modulus of the tested soil according to DIN18134: (KM 335+040)

Parameters	1st loading cycle	2nd loading cycle
($s_{0,max}$) MN/m ²	0.25	0.25
a_0 (mm)	0.06	0.41
a_1 (mm/(MN/m ²))	7.43	7.72
a_2 (mm/(MN ² /m ⁴))	-8.06	-16.37
$Ev = 1.5 r / (a_1 + a_2 \cdot s_{0,MAX})$	83.18	123.99
Ev_2/Ev_1	1.49	

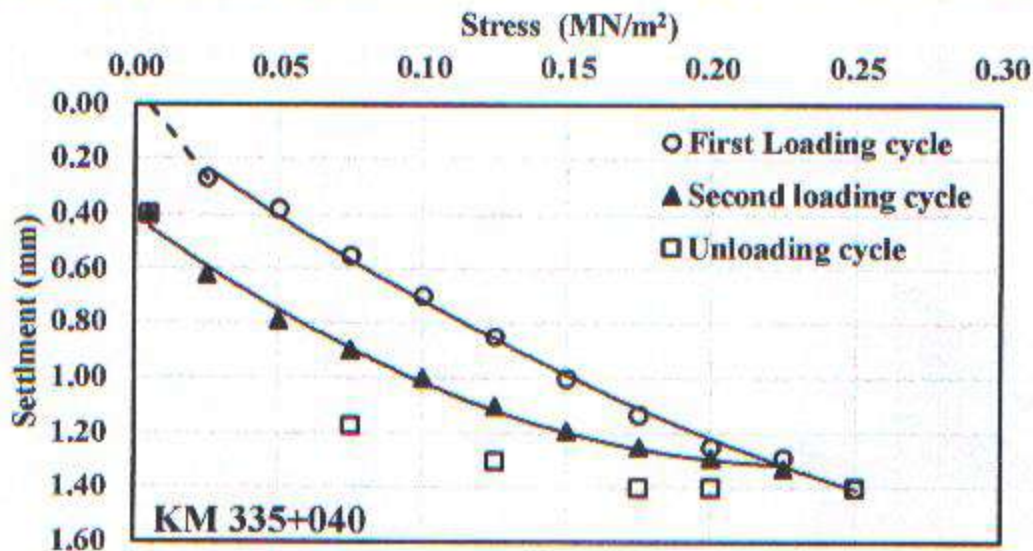


Figure 2: Load-settlement data: plate loading test performed at (KM 335+040)





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 334+940 and KM 335+040) in accordance with German Standard, DIN18134.

Location	E_{v1} MN/m ²	E_{v2} MN/m ²	E_{v2}/E_{v1} ratio
KM 334+940	81.14	103.48	1.28
KM 335+040	83.18	123.99	1.49

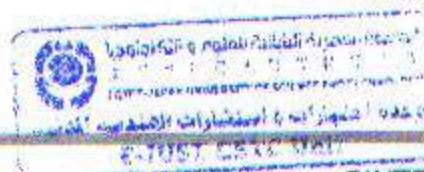
- Note: Before interpreting these test results for future applications, the Middle Embankment (-1.5 m) in-situ variability between the testing locations should be considered.

Technical committee

Prof. Dr. Mohamed F. M. Fahmy

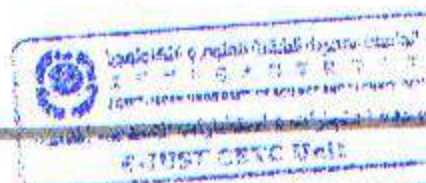
Lab Engineer

Mohamed A. Al-Najjar





Appendix A





Location of test site:	KM 334+940		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	1/11/2023
Diameter of loading plate	600		Time	1:20:00 PM 1:47:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.57	
	2	14.14	9.43	
	3	21.21	9.31	
	4	28.28	9.15	
	5	35.35	9.00	
	6	42.42	8.84	
	7	49.49	8.73	
	8	56.56	8.62	
	9	63.63	8.46	
	10	70.7	8.35	
Unloading Stage	11	56.56	8.37	
	12	49.49	8.42	
	13	35.35	8.52	
	14	21.21	8.66	
	15	1.414	9.55	
Test regime	Loading Stage No.	Load (kN)	Dial Gauge Reading (mm)	
Reloading Stage	0	1.414	9.55	
	1	7.07	9.16	
	2	14.14	9.07	
	3	21.21	9.00	
	4	28.28	8.86	
	5	35.35	8.75	
	6	42.42	8.65	
	7	49.49	8.54	
	8	56.56	8.46	
	9	63.63	8.41	



Location of test site:	KM 335+040		Field team	Sameh Hassan
Project title:	Electric Express Train Project - Aladdin and Partners Integrated Contracting		Date:	1/11/2023
Diameter of loading plate	600		Time	1:52:00 PM 2:19:00 PM
Lever ratio	1		Note: CAT 966E	
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	9.73	
	2	14.14	9.62	
	3	21.21	9.45	
	4	28.28	9.30	
	5	35.35	9.15	
	6	42.42	9.00	
	7	49.49	8.87	
	8	56.56	8.75	
	9	63.63	8.71	
	10	70.7	8.60	
Unloading Stage	11	56.56	8.60	
	12	49.49	8.60	
	13	35.35	8.70	
	14	21.21	8.83	
	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	9.38	
	2	14.14	9.21	
	3	21.21	9.10	
	4	28.28	9.00	
	5	35.35	8.90	
	6	42.42	8.81	
	7	49.49	8.75	
	8	56.56	8.71	
	9	63.63	8.67	