

**REPUBLIC OF KENYA**

**MINISTRY OF ROADS AND TRANSPORT**

**STATE DEPARTMENT OF ROADS**

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Ref No. M.2456/35/L/10 Date: 31st MAY, 2023

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| **Laboratory Test Report** |

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| **1. Customer’s Details:** CAS CONSUTANTS LTD  **E-mail: casconsultant@africaonline.co.ke**  **Address:** P.O BOX 20023-00200 NRB Phone: 0722829554  **2. Customer Contact:** 0722829554 6. Job Card No. 2390/S/2023  **3. Sample Description:** Borrow pit Material 7. Date fee paid: 28/04/2023  **4. Sampled by:** Client. 8. GOK MR No.4052850  **5. Date Sample received:** 20/04/2023 9. Date Analysis started:08/05/2023  **10. Additional information provided by the customer:** Kithimani-Wamunyu-Ukia  **KeNHA/RD/DHPD/3297/2021.**     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  | TEST RESULTS | | | | | | | | | | | | | | | | | | **Sample No.** | **Reference** | **Dosage (%)** | **Grading** | | | | | | **Atterberg Limits** | | | | | **Compaction T180** | | **CBR** | | | % Passing BS Sieve Size (mm) | | | | | | LL | PL | PI | LS | PM |  | OMC( % ) | 4days Soak  (%) | Swell(%) | | 20 | 10 | 5 | 2 | 0.425 | 0.075 | % | % | % | % |  | MDD Kg/m3 | | 932/S/22 | TP(E1,E2,E3,E4) | Neat | 100 | 93 | 78 | 48 | 35 | 28 | 35 | 17 | 18 | 9 | 630 | 1768 | 12.4 | 30 | 0.2 | | **SOIL COMPOSITION: Gravel = 52%, Sand = 20%, Silt/clay =28%** | | | | | | | | | | | | | | | | 933/S/22 | TP(E5,E6,E7,E9) | Neat | 100 | 89 | 77 | 50 | 33 | 25 | 34 | 20 | 14 | 7 | 462 | 1878 | 9.7 | 30 | 0.2 | | **SOIL COMPOSITION: Gravel = 50%, Sand = 25%, Silt/clay =25%** | | | | | | | | | | | | | | | | 934/S/22 | TP (E10, E11,E12,E13) | Neat | 100 | 95 | 80 | 53 | 35 | 30 | 33 | 20 | 13 | 6 | 455 | 1884 | 10.5 | 25 | 0.2 | | **SOIL COMPOSITION: Gravel = 47%, Sand = 23%, Silt/clay =30%** | | | | | | | | | | | | | | | | 935/S/22 | TP1+TP2 | Neat | 100 | 96 | 84 | 55 | 37 | 33 | 35 | 21 | 14 | 7 | 518 | 1828 | 9.2 | 35 | 0.2 | | **SOIL COMPOSITION: Gravel = 45%, Sand = 22 %, Silt/clay =33%** | | | | | | | | | | | | | | | | 936/S/22 | TP3+TP4+TP5 | Neat | 100 | 98 | 88 | 75 | 58 | 49 | 43 | 26 | 17 | 9 | 986 | 1742 | 11.9 | 15 | 0.1 | | **SOIL COMPOSITION: Gravel = 25%, Sand = 26%, Silt/clay =49%** | | | | | | | | | | | | | | | |

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|  | TEST RESULTS | | | | | | | | | | | | | | | | |
| **Sample No.** | **Reference** | **Dosage (%)** | **Grading** | | | | | | **Atterberg Limits** | | | | | **Compaction T180** | | **CBR** | |
| % Passing BS Sieve Size (mm) | | | | | | LL | PL | PI | LS | PM |  | OMC( % ) | 4days Soak  (%) | Swell(%) |
| 20 | 10 | 5 | 2 | 0.425 | 0.075 | % | % | % | % |  | MDD Kg/m3 |
| 932/S/22 | TP (E1, E2,E3,E4 | Neat | 100 | 93 | 78 | 48 | 35 | 28 | 35 | 17 | 18 | 9 | 630 | 1768 | 12.4 | 30 | 0.2 |
| **SOIL COMPOSITION: Gravel = 52%, Sand = 20%, Silt/clay =28%** | | | | | | | | | | | | | | |
| **IMPROVED WITH BAMBURI CEMENT 42.5NCEM1 & HYDRATED LIME 7 DAYS CURE &7DAYS SOAK** | | | | | | | | | | | | | | | |
| 3.0% C |  |  |  |  |  |  | 34 | 22 | 12 | 6 | 420 | 1750 | 12.8 | 180 | <0.1 |
| 3.0% L |  |  |  |  |  |  | 32 | 24 | 8 | 4 | 280 | 1745 | 13.0 | 80 | <0.1 |
| 933/S/22 | TP(E5,E6,E7,E9) | Neat | 100 | 89 | 77 | 50 | 33 | 25 | 34 | 20 | 14 | 7 | 462 | 1878 | 9.7 | 30 | 0.2 |
| **SOIL COMPOSITION: Gravel = 50%, Sand = 25%, Silt/clay =25%** | | | | | | | | | | | | | | |
| **IMPROVED WITH BAMBURI CEMENT 42.5NCEM1 & HYDRATED LIME 7 DAYS CURE &7DAYS SOAK** | | | | | | | | | | | | | | | |  |
| 3.0%C |  |  |  |  |  |  | 38 | 29 | 9 | 4 | 297 | 1850 | 11.5 | 210 | <0.1 |
| 3.0%L |  |  |  |  |  |  | 36 | 30 | 6 | 3 | 198 | 1848 | 12.0 | 75 | <0.1 |
| 934/S/22 | TP (E10, E11, E12,E13) | Neat | 100 | 95 | 80 | 53 | 35 | 30 | 33 | 20 | 13 | 6 | 455 | 1884 | 10.5 | 25 | 0.2 |
| **SOIL COMPOSITION: Gravel = 47%, Sand = 23%, Silt/clay =30%** | | | | | | | | | | | | | | |
| **IMPROVED WITH BAMBURI CEMENT 42.5NCEM1 & HYDRATED LIME 7 DAYS CURE &7DAYS SOAK** | | | | | | | | | | | | | | | |
| 3.0%C |  |  |  |  |  |  | 36 | 2 | 8 | 4 | 280 | 1860 | 11.6 | 210 | <0.1 |
| 3.0%L |  |  |  |  |  |  | 38 | 33 | 5 | 3 | 175 | 1848 | 12.0 | 90 | <0.1 |
| 935/S/22 | TP1+TP2 | Neat | 100 | 96 | 84 | 55 | 37 | 33 | 35 | 21 | 14 | 7 | 518 | 1828 | 9.2 | 30 | 0.2 |
| **SOIL COMPOSITION: Gravel = 45%, Sand = 22 %, Silt/clay =33%** | | | | | | | | | | | | | | |
| **IMPROVED WITH BAMBURI CEMENT 42.5NCEM1 & HYDRATED LIME 7 DAYS CURE &7DAYS SOAK** | | | | | | | | | | | | | | | |
| 3.0%C |  |  |  |  |  |  | 40 | 31 | 10 | 5 | 370 | 1800 | 11.5 | 180 | <0.1 |
| 3.0%L |  |  |  |  |  |  | 38 | 32 | 6 | 3 | 222 | 1790 | 12.3 | 80 | <0.1 |
| 936/S/22 | TP3+TP4+TP5 | Neat | 100 | 98 | 88 | 75 | 58 | 49 | 43 | 26 | 17 | 9 | 986 | 1742 | 11.9 | 15 | 0.1 |
| **SOIL COMPOSITION: Gravel = 25%, Sand = 26%, Silt/clay =49%** | | | | | | | | | | | | | | |
| **IMPROVED WITH BAMBURI CEMENT 42.5N CEM1 & HYDRATED LIME 7 DAYS CURE &7DAYS SOAK** | | | | | | | | | | | | | | | |
| 3.0%C |  |  |  |  |  |  | 40 | 28 | 12 | 6 | 696 | 1730 | 12.6 | 150 | <0.1 |
| 3.0%L |  |  |  |  |  |  | 39 | 32 | 7 | 4 | 406 | 1725 | 13.0 | 70 | <0.1 |

**Eng. J. M. Mbarua**

**For: CHIEF ENGINEER (MATERIALS)**

**OiC Soils Laboratory CSE Soils Laboratory**

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