

APPENDIX 2-2

Geological Survey Results

1. List of Boreholes

| Borehole No. | Profile Cross Section File Number | Chain-age | Elevation (m) | Distance from KCR Line | | Depth (m) | Lithology | Nothing | Retain in bore to bore (m) | Type of Structure/ Foundation | Proposed Structure on KCR Route | BH Location Between Stations (Old) | | Distance from Realignement Track / Structure (m) | Remarks |
|--------------|-----------------------------------|-----------|---------------|------------------------|-------|-----------|-----------|---------|----------------------------|-------------------------------|---------------------------------|------------------------------------|--------------|--|---|
| | | | | Right | Left | | | | | | | From | To | | |
| KCR/BH-1 | RC-001 | 0 | 21.53 | - | 38.20 | 20.00 | 310736 | 2753699 | 292.18 | Drigh Road Station Building | Viaduct | Drigh Road | Drigh Hill | 10.08.0 | Between Foot Over Bridge & Police Station at Drigh Road Station. |
| KCR/BH-2 | RC-009 | 0 | 480.83 | - | 25.80 | 20.00 | 311195 | 2753716 | 499.30 | On Ground | Viaduct | Drigh Road | Drigh Hill | 10.5.8.0 | At the end of PK boundary wall at Drigh Road Station near under pass for Drigh Road Canal Area between PK marker 194 & 195 |
| KCR/BH-3 | RC-015 | 0 | 840.83 | - | 2.70 | 20.00 | 311549 | 2753724 | 360.00 | On Ground | Ground | Drigh Road | Drigh Hill | 26.0.19.0 | Proposed Under Pass for Shah Faisal Colony. Between PK Km marker 199 & 191.0 |
| KCR/BH-4 | RC-026 | 1 | 501.39 | - | 29.40 | 20.00 | 311729 | 2754314 | 660.56 | On Ground | Ground | Drigh Road | Drigh Hill | 19.0.16.1 | Between home and outer signal of Depot Hill near COD Bridge. |
| KCR/BH-5 | RC-034 | 2 | 2.66 | - | 29.80 | 20.00 | 311747 | 2754805 | 501.27 | On Ground | Ground | Drigh Hill | Drigh Hill | 19.0.16.1 | 19.0.16.1 |
| KCR/BH-6 | RC-042 | 2 | 483.60 | - | 33.20 | 15.00 | 311720 | 2755287 | 480.94 | On Ground | Ground | Drigh Hill | University | 19.09.01.1 | Opposite 'end of Air Port fence', COD area. |
| KCR/BH-7 | RC-050 | 2 | 962.32 | - | 17.60 | 15.00 | 311651 | 2755743 | 478.72 | On Ground | Ground | Drigh Hill | University | 19.09.01.1 | Opposite Raha City, COD area. |
| KCR/BH-8 | RC-057 | 3 | 382.81 | 19.50 | - | 15.00 | 311347 | 2756021 | 420.49 | On Ground | Ground | Drigh Hill | University | 15.10.6 | Inside Ruff Banglows, at empty plot, Gulshan-e-Johar - 19 |
| KCR/BH-9 | RC-066 | 3 | 903.76 | 26.76 | 9.40 | 15.00 | 310833 | 2756069 | 520.95 | On Ground | Ground | Drigh Hill | University | 21.3L-sing level | KCR Old level - X No.2, BEHIND Watch man Room, Gulshan-e-Johar - 19 |
| KCR/BH-10 | RC-074 | 4 | 382.46 | - | 9.80 | 15.00 | 310375 | 2756935 | 478.70 | On Ground | Ground | Drigh Hill | University | 8.67.7 | Between Jadhav Bridge and Level -X No.2, Gulshan-e-Johar - 19 |
| KCR/BH-11 | RC-083 | 4 | 921.60 | 32.60 | 0.50 | 15.00 | 309850 | 2759671 | 539.14 | On Ground | cutvert | Drigh Hill | University | 8.67.7 | In front of Sumaira Corner Apartment Near Gulshan-e-Johar Road Over Bridge (Under water). |
| KCR/BH-12 | RC-090 | 5 | 361.52 | - | 1.20 | 15.00 | 309560 | 2756290 | 439.92 | Tunnel | cutvert | Drigh Hill | University | 15.0 | Li. Site of track, in front of abulhish house, E-84, PRECHS Block-10A, Gulshan-e-Johar. |
| KCR/BH-13 | RC-099 | 5 | 880.79 | 1.50 | - | 15.00 | 309284 | 2756730 | 519.27 | Alhdi Sh. Building, Tunnel | cutvert | Drigh Hill | University | 15.0 | Back Side of Tenor Parking end of (Rafiq Hill Apartment), Moon Builders Apartments (Across the Channul). |
| KCR/BH-14 | RC-115 | 6 | 841.02 | 2.30 | - | 15.00 | 308493 | 2757130 | 960.23 | Tunnel | cutvert | Drigh Hill | University | 6.0.15.0 | Jumma Goth (NIP AL), Opposite white Mosque, STNo:221-800 at Right side of track. |
| KCR/BH-15 | RC-124 | 7 | 381.40 | - | 9.06 | 15.00 | 307973 | 2756984 | 540.38 | Npa Station Building | Ground | University | Urdu College | 7.7.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-16 | RC-133 | 7 | 941.75 | 32.75 | 14.67 | 15.00 | 307424 | 2756868 | 560.35 | On Ground | Ground | University | Urdu College | 6.0.7.6 | In Front of Custom Club Level, Under Aziz Bhatti Park Road Over Bridge |
| KCR/BH-17 | RC-139 | 8 | 281.20 | 31.20 | 8.05 | 15.00 | 307092 | 2756716 | 339.45 | On Ground | Viaduct | University | Urdu College | 6.0.7.6 | Urdu College Station Platform Gilhani Station side, Right Side of Track, Near Banglow No. L-21/31/1, Gulshan-e-Johar Block-13 |
| KCR/BH-18 | RC-143 | 8 | 541.32 | 29.32 | 8.30 | 15.00 | 306845 | 2756711 | 260.12 | On Ground | Viaduct | University | Urdu College | 13.0.25.0 | In Front of Banglow No. B-56 Gulshan-e-Johar 13-C, Opposite Madhik Tower |
| KCR/BH-19 | RC-152 | 9 | 61.48 | - | 10.00 | 15.00 | 306388 | 2756466 | 520.16 | Elevated | Viaduct | Urdu College | Ghani | 12.31.5.0 | Back Side of Tenor Parking end of (Rafiq Hill Apartment), Moon Builders Apartments (Across the Channul). |
| KCR/BH-20 | RC-161 | 9 | 601.14 | 26.14 | 28.80 | 15.00 | 305924 | 2756189 | 539.66 | Ghani Station Building | Viaduct | Urdu College | Ghani | 20.0.15.0 | Back Side of Tenor Parking end of (Rafiq Hill Apartment), Moon Builders Apartments (Across the Channul). |
| KCR/BH-21 | RC-176 | 10 | 501.07 | 24.07 | 4.76 | 15.00 | 305104 | 2758330 | 899.93 | Elevated | Viaduct | Ghani | Laqunabad | 7.7.15.0 | Jumma Goth (NIP AL), Opposite white Mosque, STNo:221-800 at Right side of track. |
| KCR/BH-22 | RC-186 | 11 | 141.60 | 15.60 | - | 15.00 | 304535 | 2756071 | 640.53 | Elevated | Viaduct | Ghani | Laqunabad | 7.7.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-23 | RC-188 | 11 | 225.33 | 19.33 | 36.00 | 15.00 | 304443 | 2756087 | 83.73 | Elevated | Viaduct | Ghani | Laqunabad | 7.7.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-24 | RC-191 | 11 | 422.01 | 22.01 | 21.70 | 20.00 | 304319 | 2756250 | 196.68 | Yasinabad Station Building | Viaduct | Ghani | Laqunabad | 15.7.7 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-25 | RC-199 | 11 | 900.41 | 20.41 | 12.00 | 20.00 | 303930 | 2756238 | 478.40 | Elevated | Viaduct | Ghani | Laqunabad | 15.0.6.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-26 | RC-208 | 12 | 440.40 | 20.40 | 22.90 | 20.00 | 303476 | 2756821 | 539.99 | Laqunabad Station Building | Ground | Ghani | Laqunabad | 15.0.6.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-27 | RC-219 | 13 | 120.90 | 21.90 | 10.60 | 20.00 | 302940 | 2757254 | 680.50 | Elevated | Ground | Ghani | Laqunabad | 6.0.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-28 | RC-229 | 13 | 721.43 | 21.43 | 10.50 | 20.00 | 302418 | 2757532 | 690.53 | Elevated | Viaduct | Ghani | Laqunabad | 6.0.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-29 | RC-230 | 13 | 763.51 | 22.31 | 2.60 | 20.00 | 302375 | 2757533 | 42.08 | Elevated | Viaduct | Ghani | Laqunabad | 6.0.15.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-30 | RC-242 | 14 | 501.85 | 23.85 | 18.90 | 20.00 | 301652 | 2757671 | 738.24 | N/A Station Building | Ground | Ghani | Laqunabad | 16.5.7.7 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-31 | RC-249 | 14 | 920.50 | 25.50 | 12.10 | 20.00 | 301260 | 2757832 | 418.65 | On Ground | Ground | North Nazim | Orangi | 6.0.1.8.6 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-32 | RC-255 | 15 | 281.80 | 26.28 | 7.70 | 20.00 | 300931 | 2757702 | 361.30 | Elevated | Ground | North Nazim | Orangi | 7.7.7.7 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-33 | RC-262 | 15 | 701.32 | 25.32 | 4.00 | 20.00 | 300659 | 2757383 | 419.52 | Elevated | Viaduct | North Nazim | Orangi | 7.7.7.7 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |
| KCR/BH-34 | RC-272 | 16 | 301.37 | 24.37 | 12.45 | 20.00 | 300126 | 2757129 | 600.05 | Orangi Station Building | Viaduct | North Nazim | Orangi | 18.6.4.7.0 | Back Side of PK Quarter at NIPA, Left Side of Track, Near Nipa Bridge |

| Borehole No. | Profile Cross Section File Number | Chain-age | | Elevation (m) | Distance from KCR Line | | Depth (m) | Easting | Northing | Between bore to bore (m) | Type of Structure/ Foundation | Proposed Structure on KCR Route | BH Location Between Stations (Old) | | Distance from nearest Track / Structure (m) | Land Marks | Remarks |
|--------------|-----------------------------------|-----------|--------|---------------|------------------------|-------|-----------|---------|----------|--------------------------|--------------------------------|---------------------------------|------------------------------------|-------------|---|--|----------------|
| | | | | | Right | Left | | | | | | | From | To | | | |
| KCR/BH-35 | RC-285 | 17 | 41.62 | 23.62 | - | 6.40 | 20.00 | 299422 | 2756909 | 740.25 | HBL Station Building | Ground | Orangi | Manghopir | 7.7/7.7 | HBL Station near Pepsi Factory, Stn. 12+640 Right side ,Manghopir Bridge, Adjacent to Hino Pak Health Community | |
| KCR/BH-36 | RC-294 | 17 | 583.10 | 23.10 | 7.20 | - | 20.00 | 298984 | 2756597 | 541.48 | Elevated | Ground | Orangi | Manghopir | 7.7/7.7 | Stn. 12+080,Near Railway Crossing Road,Near RAH GUZAR Masjid, Manghopir Station Side | |
| KCR/BH-37 | RC-300 | 17 | 942.76 | 20.76 | - | 4.45 | 20.00 | 298711 | 2756361 | 359.66 | Elevated | Viaduct | Orangi | Manghopir | 7.7/7.7 | Stn.11+700 | |
| KCR/BH-38 | RC-308 | 18 | 460.48 | 19.48 | - | 8.93 | 20.00 | 298312 | 2756032 | 517.72 | Manghopir Station Building | Viaduct | Orangi | Manghopir | 15.0/16.5 | Near Pedestrian Bridge at Manghopir Station, at Manghopir Stn near food over bridge | |
| KCR/BH-39 | RC-320 | 19 | 141.27 | 18.27 | 4.00 | - | 20.00 | 297775 | 2755613 | 680.79 | Elevated | Viaduct | Manghopir | SITE | 7.7/6.0 | Station 10+500,Siemens Starting Point,Site station End Left Side Near Railway Crossing | |
| KCR/BH-40 | RC-331 | 19 | 782.34 | 15.34 | 2.26 | - | 20.00 | 297277 | 2755209 | 641.07 | Elevated | Viaduct | Manghopir | SITE | 6.0/14.0 | Near Level Crossing No. 19,Right Side of Track, SITE Side Near U-fone Mobile tower | |
| KCR/BH-41 | RC-340 | 20 | 341.36 | 14.36 | 4.46 | - | 20.00 | 296841 | 2754860 | 559.02 | Elevated | Viaduct | Manghopir | SITE | 6.0/7.7 | Between Site Station and Level Crossing ,Under KCR Padestarin Bridge of SITE Stn | |
| KCR/BH-42 | RC-351 | 20 | 982.14 | 12.14 | 7.40 | - | 20.00 | 296341 | 2754458 | 640.78 | SITE Station Building | Viaduct | Manghopir | SITE | 15.0/6.0 | Between Northren ByPass,ShahShah Bridge and Site Station | |
| KCR/BH-43 | RC-361 | 21 | 601.45 | 10.45 | 4.00 | - | 20.00 | 295862 | 2754066 | 619.31 | Elevated | Viaduct | SITE | Shah Abdul | 4.6/4.6 | Back Side of Isuzu Factory, Shah Latif Station, Left side | |
| KCR/BH-44 | RC-370 | 22 | 161.29 | 9.29 | 7.90 | - | 20.00 | 295428 | 2753712 | 559.84 | S.A.Latif Station Building | Viaduct | SITE | Shah Abdul | 6.0/6.0 | SITE End of Shah Latif Station Platform, Near Bridge N0.33 (Stn. 22+00), at Shah Latif Stn. | |
| KCR/BH-45 | RC-377 | 22 | 540.77 | 8.77 | 6.70 | - | 20.00 | 295133 | 2753474 | 379.48 | Elevated | Viaduct | Shah Abdul | Baldia | 7.7/7.3 | Near Level Crossing No.22, Right Side | |
| KCR/BH-46 | RC-384 | 23 | 0.84 | 6.84 | 2.10 | - | 20.00 | 294776 | 2753184 | 460.07 | Elevated | Viaduct | Shah Abdul | Baldia | 8.6/6.6 | Infront of PR Shed-No.02,Behind Brooke Bond Tea Factory,Near level Crossing No-23, near Brook Bond L-xing | |
| KCR/BH-47 | RC-392 | 23 | 441.80 | 5.80 | - | 1.50 | 20.00 | 294587 | 2752818 | 440.96 | Elevated | Viaduct | Shah Abdul | Baldia | 6.0/8.3 | Behind Shell Petrol Pump at Gul Bai, near L-xing # 24. | |
| KCR/BH-48 | RC-394 | 23 | 602.90 | 5.90 | 13.50 | - | 30.00 | 294652 | 2752669 | 161.10 | Elevated | Viaduct | Shah Abdul | Baldia | 7.7/33.0 PR Boundary | Near Level-X No.24, In Front of PR Quarter, Gul Bai, near Weigh Bridge at Gulbai | bridge |
| KCR/BH-49 | RC-397 | 23 | 783.71 | 6.71 | - | 7.40 | 30.00 | 294816 | 2752586 | 180.81 | Baldia Station Building | Viaduct | Shah Abdul | Baldia | 6.0/9.0 | Centre of existing Baldia Station Plat Form. | station |
| KCR/BH-50 | RC-408 | 24 | 442.05 | 2.05 | 5.90 | - | 30.00 | 295377 | 2752243 | 658.34 | Bridge (Elevated) | Viaduct | Baldia | Lyari | 9.0/6.0 | PR Bridge pier No. 2 Baldia end, Sea Side | |
| KCR/BH-51 | RC-420 | 25 | 121.55 | 3.55 | 6.40 | - | 30.00 | 295932 | 2751850 | 679.50 | Lyari Station Building | Viaduct | Baldia | Lyari | 9.6/32.4 | At Lyari Station infront of community, Therapy Centre, | B-1(2011) |
| KCR/BH-52 | RC-425 | 25 | 461.74 | 3.74 | - | 2.10 | 30.00 | 296214 | 2751660 | 340.19 | Elevated | Viaduct | Lyari | Wazir Mansi | 6.0/9.0 | Opposite KESC Grid Station, Machar Colony. | |
| KCR/BH-53 | RC-435 | 26 | 60.89 | 2.89 | 11.90 | - | 30.00 | 296569 | 2751206 | 599.15 | Track | Viaduct | Lyari | Wazir Mansi | 8.0/48.0 | Near Pedestrian Bridge, opposite TCF School. | |
| KCR/BH-54 | RC-443 | 26 | 520.74 | 2.74 | 48.10 | - | 30.00 | 296529 | 2750753 | 459.85 | Wazir Mansion Station Building | Ground | Lyari | Wazir Mansi | 12.3/37.0 | Opposite Peoples Sports complex Near the Ramp, near Wazir Mansion. | station |
| KCR/BH-55 | RC-450 | 26 | 941.33 | 2.33 | - | 7.20 | 30.00 | 296543 | 2750332 | 420.59 | On Ground | Ground | Wazir Mansi | KPT | 7.7/18.6 | Between Navy Fence AND ICI Bridge, near ICI Bridge before Wazir Mansion Stn. | |
| KCR/BH-56 | RC-459 | 27 | 482.36 | 3.36 | - | 7.30 | 30.00 | 296764 | 2749849 | 541.03 | On Ground | Viaduct | Wazir Mansi | KPT | 7.7/7.7 | Near PR level-X No. 29, Near Ufone Tpwer, West Wharf, near L-xing # 29. | |
| KCR/BH-57 | RC-468 | 27 | 982.00 | 3.00 | - | 11.90 | 30.00 | 297040 | 2749446 | 499.64 | On Ground | Ground | KPT | City | 6.0/7.7 | Under KPT Bridge (Jinnah) chainage- 91863 (EMC). | |
| KCR/BH-58 | RC-477 | 28 | 541.51 | 3.51 | - | 19.00 | 30.00 | 297585 | 2749449 | 559.51 | Tower Station Building | Ground | KPT | City | 9.0/36.0 KBX shed | End of LPO Shed , opposite Bahria Complex -2 | B-2(2011) |
| KCR/BH-59 | RC-482 | 28 | 861.55 | 3.55 | - | 16.80 | 30.00 | 297899 | 2749512 | 320.04 | Elevated | Viaduct | KPT | City | 6.0/9.0 | MT Khan Level-X | |
| KCR/BH-60 | RC-493 | 29 | 560.75 | 2.75 | 34.00 | - | 30.00 | 298602 | 2749536 | 699.20 | City Station Building | Ground | City | Cantt | 12.3/10.9 | City Station, oppsite KTL Building, Near Watch Tower. City STN Yard, Towards HTXR Office | B-3(2011) City |
| KCR/BH-61 | RC-500 | 29 | 948.79 | 2.80 | 47.20 | - | 30.00 | 298985 | 2749602 | 388.04 | Elevated | Ground | City | Cantt | 18.6/9.6 | Between Sick line and KYC Goods Yard, mosque at right side, Down side, City Yard. | station |
| KCR/BH-62 | RC-509 | 30 | 529.74 | 3.74 | 25.60 | - | 30.00 | 299539 | 2749679 | 580.95 | Track | Ground | City | Cantt | 15.0/10.9 | Near Jang Press Foot over Bridge, down side. | |
| KCR/BH-63 | RC-521 | 31 | 229.45 | 3.45 | 17.50 | - | 30.00 | 300119 | 2749317 | 699.71 | Track | Ground | City | Cantt | 7.3/6.0 Bridge | Near PIDC Bridge KYC and Down side, PR Km marker 6/14 & 7. | |
| KCR/BH-64 | RC-527 | 31 | 589.74 | 3.74 | - | 9.20 | 30.00 | 300414 | 2749108 | 360.29 | DCOS Station Building | Ground | City | Cantt | 9.0/6.0 | DCOS Station Between PR Km marker 7/2 & 7/3, behind Shaikh Zaid Building, up side. | |
| KCR/BH-65 | RC-535 | 32 | 89.49 | 3.49 | - | 5.00 | 30.00 | 300828 | 2748838 | 499.75 | Track | Ground | City | Cantt | 9.0/6.0 | Between PR Km marker 7/8 & 7/9, Kashmir Mujahid Colony, up side. | |
| KCR/BH-66 | RC-542 | 32 | 489.15 | 5.15 | - | 7.40 | 30.00 | 301218 | 2748768 | 399.66 | Track | Ground | City | Cantt | 7.7/7.7 | Between PR Km marker 7/14 & 8, Near Clifton Bridge, up side. | |
| KCR/BH-67 | RC-554 | 33 | 228.17 | 7.17 | - | 37.70 | 30.00 | 301893 | 2749007 | 739.02 | Cantt Station Building | Viaduct | City | Cantt | 18.6/9.6 | Between Police Station and Telecom building at Cantt Station, Near Gate (Out), up side, backside of Parcel office.(KC) | B-4(2011) |
| KCR/BH-68 | RC-561 | 33 | 649.84 | 9.84 | - | 27.00 | 30.00 | 302266 | 2749205 | 421.67 | Elevated | Viaduct | Cantt | Chanesar Ha | 12.2/10.7 | End of Goods Store, Near PWI KC Store at Cantt Station, Up Side. | |

| Borehole No. | Profile Cross Section File Number | Chain-age | Elevation (m) | Distance from KCR Line | | Depth (m) | Easting | Northing | Between bore to bore(m) | Type of Structure/ Foundation | Proposed Structure on KCR Route | BH Location Between Stations (Old) | | Distance from nearest Track / Structure (m) | Land Marks | Remarks | |
|--------------|-----------------------------------|-----------|---------------|------------------------|--------|-----------|---------|----------|-------------------------|-------------------------------|-----------------------------------|------------------------------------|-------------|---|------------|---|-----------------------|
| | | | | Right | Left | | | | | | | From | To | | | | |
| KCR/BH-69 | RC-571 | 34 | 232.82 | 14.82 | - | 34.20 | 20.00 | 302769 | 2749499 | 582.98 | Elevated | Viaduct | Cantt | Chanesar Ha | 12.2/6.0 | Near Sultan shah Bhukari Sharine, Up Side. | |
| KCR/BH-70 | RC-577 | 34 | 569.77 | 12.77 | 19.00 | - | 15.00 | 303093 | 2749610 | 336.95 | Naval Station Building | Viaduct | Cantt | Chanesar Ha | 15.0/6.0 | Enchroached Sammo Bridge, Drig Road End, Down Side, Shifa Clinic Dr Shamim,(right side) | |
| KCR/BH-71 | RC-587 | 35 | 210.39 | 12.39 | 25.70 | - | 15.00 | 303653 | 2749919 | 640.62 | Track | Viaduct | Cantt | Chanesar Ha | 18.3/12.2 | Between PR Km marker 10/12 & 10/13, Masoom Shah Colony , Down Side. | |
| KCR/BH-72 | RC-597 | 35 | 810.42 | 7.42 | 16.10 | - | 15.00 | 304174 | 2750220 | 600.03 | Elevated | Viaduct | Cantt | Chanesar Ha | 18.3/12.2 | Between PR Km marker 11/5 & 11/6, near signal Down Side. | |
| KCR/BH-73 | RC-605 | 36 | 270.27 | 8.27 | - | 10.40 | 20.00 | 304561 | 2750469 | 459.85 | Elevated | Viaduct | Cantt | Chanesar Ha | 10.7/7.6 | Chanesar Level Crossing KC End Up Side. | |
| KCR/BH-74 | RC-607 | 36 | 389.45 | 7.45 | - | 40.40 | 20.00 | 304650 | 2750554 | 119.18 | Chanesar Station Building | Viaduct | Cantt | Chanesar Ha | 27.4/10.7 | Back Side of existing Chanesar Halt Station Building, up side.(Access way for passengers) | Chanesar Halt station |
| KCR/BH-75 | RC-617 | 36 | 988.14 | 7.14 | - | 6.00 | 20.00 | 305188 | 2750819 | 598.69 | On Ground | Viaduct | Chanesar Ha | Departure Ya | 7.6/7.6 | PR Km marker 12/8, near Baitihk School (New Sindhi Muslim colony) up side. | |
| KCR/BH-76 | RC-625 | 37 | 469.53 | 6.53 | - | 6.30 | 20.00 | 305606 | 2751057 | 481.39 | On Ground | Ground | Chanesar Ha | Departure Ya | 9.0/7.6 | Between PR Km marker 12/14 & 13, Bridge No. 12, up Side. | |
| KCR/BH-77 | RC-636 | 38 | 129.52 | 8.52 | 14.30 | - | 20.00 | 306190 | 2751365 | 659.99 | On Ground | Ground | Chanesar Ha | Departure Ya | 9.0/7.3 | PR Km marker 13/9, Omer Colony, Opposite Amun State Building down side, Umar Colony # 2, Down Side. | |
| KCR/BH-78 | RC-640 | 38 | 348.58 | 9.58 | - | 22.40 | 20.00 | 306363 | 2751505 | 219.06 | Shaheed-e-Millat Station Building | Ground | Chanesar Ha | Departure Ya | 12.2/18.3 | Between PR Km marker 12/14 & 13 , Near Shaheed Millat Bridge, KYC Up Side. | |
| KCR/BH-79 | RC-651 | 39 | 10.55 | 12.55 | - | 15.40 | 20.00 | 306944 | 2751822 | 661.97 | On Ground | Ground | Departure Y | Karsaz Halt | 12.2/7.6 | Between PR Km marker 14/8 & 14/9 Departure yard. | |
| KCR/BH-80 | RC-658 | 39 | 492.87 | 15.87 | - | 68.70 | 20.00 | 307337 | 2752106 | 482.32 | On Ground | Ground | Departure Y | Karsaz Halt | 24.3/7.6 | Inside KW&SB Premises, (previous SP Location for KCR), Inside MD KW&SB office | KW&SB |
| KCR/BH-81 | RC-664 | 39 | 869.90 | 12.90 | - | 25.20 | 20.00 | 307686 | 2752254 | 377.03 | On Ground | Ground | Departure Y | Karsaz Halt | 27.4/8.5 | Behind Karsaz Bridge, KW&SB Primeses , between PR Km marker 15/6 & 15/7., Inside KW&SB Colony. | |
| KCR/BH-82 | RC-673 | 40 | 373.32 | 15.72 | - | 61.50 | 20.00 | 308107 | 2752534 | 503.42 | Karsaz Station Building | Ground | Karsaz Halt | PAF Halt | 33.5/19.8 | Between PR Km marker 15/14 & 16, Karsaz Halt, at Karsaz Stn. Shahrah-e-Faisal Side. | PAF |
| KCR/BH-83 | RC-682 | 40 | 909.00 | 14.00 | - | 10.00 | 20.00 | 308599 | 2752752 | 535.68 | On Ground | Ground | Karsaz Halt | PAF Halt | 9.0/25.9 | Road Between PR Km marker 16/7 & 16/8, oppsite Saber Fighter monument, PAF watch tower, up side. | |
| KCR/BH-84 | RC-691 | 41 | 409.03 | 15.03 | - | 11.70 | 20.00 | 309033 | 2753000 | 500.03 | On Ground | Ground | Karsaz Halt | PAF Halt | 9.8/19.8 | Near PR Km marker 16/14, up side. | |
| KCR/BH-85 | RC-702 | 42 | 89.57 | 14.57 | - | 10.10 | 20.00 | 309628 | 2753330 | 680.54 | On Ground | Ground | Karsaz Halt | PAF Halt | 9.0/6.0 | PAF Halt Station Plate Form KYC and under electric pole, up side. | |
| KCR/BH-86 | RC-713 | 42 | 729.35 | 15.35 | - | 8.80 | 20.00 | 310225 | 2753563 | 639.78 | On Ground | Ground | PAF Halt | Drigh Road | 12.2/9.0 | Petrol Pump Back Side of Shell Pump Between PR Km marker 18/3 & 18/4, up side. | |
| KCR/BH-87 | RC-103 | 6 | 146.52 | 42.52 | - | 55.90 | 15.00 | 309089 | 2756908 | | Elec. Sub-Sta. | | Depot Hill | University | 48.8/7.3 | Beside Aladin Park, Johar Side, Near Car Penter Shop R/36 PREH Society(Private Land) | |
| KCR/BH-88 | RC-405 | 24 | 220.00 | 2.62 | 198.50 | - | 30.00 | 295097 | 2752195 | | Elec. Sub-Sta. | | Baldia | Lyari | 38.1/24.4 | Factory Infront of gate of 3rd factory from PR Bridge at liyari river towards Sea , near Lyari River.(Revenue Dept. Land) | |
| KCR/BH-89 | RC-670 | 40 | 189.68 | 12.68 | - | 58.60 | 15.00 | 307949 | 2752441 | | Elec. Sub-Sta. | | Departure Y | Karsaz Halt | 25.9/10.7 | KW&SB Work Shop, Karsaz, inside KW&SB workshop, for SP Post. | |
| KCR/BH-90 | RC-275 | 16 | 440.50 | 23.50 | - | 56.26 | 15.00 | 300014 | 2757021 | | Elec. Sub-Sta. | | North Nazim | Orangi | 24.4/15.0 | Inside Block Factory, Near Water Pump , beside Police Station, Orangi Station, Electric SP Post, Paposh Police Post. | |
| BP-01 | RC-412 | 24 | 641.58 | 2.59 | 5.00 | - | 40.00 | 295538 | 2752131 | | | | | | | | |
| BP-02 | RC-471 | 28 | 181.60 | 2.87 | - | 9.00 | 40.00 | 297229 | 2749416 | | | | | | | | |
| BP-03 | RC-492 | 29 | 422.14 | 3.14 | - | 15.20 | 40.00 | 298457 | 2749566 | | | | | | | | |
| BP-04 | - | 33 | 35.80 | 7.53 | - | 25.40 | 40.00 | 301732 | 2748902 | | | | | | | | |
| BP-05 | - | 4 | 982.50 | 38.06 | 16.20 | - | 20.00 | 309812 | 2756011 | | | | | | | | |
| BP-06 | - | 6 | 485.90 | 39.87 | 35.50 | - | 20.00 | 308854 | 2757157 | | | | | | | | |

Legend:

Stn. = Station(Railway/Chaimage)

L-X = Intersection of Road & Railway Track

PR = Pakistan Railway

km = Kilo Meter

KW&SB = Karachi Water & Sewarage Board

KYC = Karachi City

2. Drill Logs

SUBSURFACE EXPLORATION LOG FIELD DATA




Sheet 1 of 2

| Client: The JICA Study Team | | Type of Boring: Rotary | | N: 2753706 | | Ground Water: 4.90m | | Borehole No: KCR/BHF1 | | | | | | | | | |
|--|----------------|---------------------------|------------|--|---------|-------------------------|---------|-----------------------------|-------|---------------|-----------|--------------------|-----------|---------|----------------------------|--|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | Machine Make: Russian | | Co-ordinate: E: 42R310740 | | Geologist: Aurangzab | | Date Started: Apr-13-2012 | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | Drilling Fluid: Bentonite | | Ground Elevation: +15.53 | | Driller: Muhammad Murad | | Date Completed: Apr-16-2012 | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | Remarks | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | 30 cm | Graph N/30 cm | Depth (m) | Core Recovery (Cm) | R.Q.D (%) | | Core Waxed for Testing (m) | | |
| 0.00 | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | 2 | V | Brown, loose, fine to coarse, Silty SAND, little Gravels. | 2 | 3 | 3 | 3 | 9 | | 0.00 | 92 | NA | - | - | | |
| 2.00 | CRS-2 SPT-2 | | V | | 18 | 15 | 21 | 10 | 46 | | 1.00 | 88 | NA | - | - | | |
| 3.00 | CRS-3 SPT-3 | | V | Brown, dense to very dense, fine to coarse, Silty SAND/ Clayey SAND, little to some Gravels. | 8 | 10 | 10 | 14 | 34 | | 2.00 | 59 | NA | - | - | | |
| 4.00 | CRS-4 SPT-4 | | V | | 33 | 40/10cm | | | R | | 3.00 | 73 | NA | - | - | | |
| 5.00 | CRS-5 SPT-5 | 5.5 | V | | 50/9cm | | | | R | | 4.00 | 70 | NA | - | - | | |
| 6.00 | CRS-6 SPT-6 | | V | | 28 | 34 | 35 | 25 | 94 | | 5.00 | 41 | NA | - | - | | |
| 7.00 | CRS-7 SPT-7 | | V | | 51/13cm | | | | R | | 6.00 | 78 | NA | - | - | | |
| 8.00 | CRS-8 SPT-8 | | V | Brown, very hard, Silty CLAY/ Clayey SILT, little Sand. | 12 | 18 | 24 | 30 | 72 | | 7.00 | 79 | NA | 7.68 | 7.81 | | Sample Waxed 13cm |
| 9.00 | CRS-9 SPT-9 | 2.5 | V | | 13 | 17 | 26 | 32 | 75 | | 8.00 | 95 | NA | 8.57 | 8.67 | | Sample Waxed 10cm |
| 10.00 | CRS-10 | | V | | | | | | | | 9.00 | 99 | NA | - | - | | |

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery ROD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2753719 | | Ground Water: 4.90m | | Borehole No: KCR/BH#2 | | | | | | | | | | | | | | | | | |
|--|------------------|------------------------|--|--|---------|--------------------------|----------------|-------------------------|--------------|-----------------------------|----|----|----|----|---------|-----------|----|--------------------|-----------|----------------------------|----|--|--|--|--|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311198 | | Geologist: Aurangzaib | | Date Started: Apr-09-2012 | | | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +13.86 | | Driller: Muhammad Murad | | Date Completed: Apr-14-2012 | | | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | Remarks | | | | | | | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | From | To | | | From | to | | | | | | |
| 10.00 | SPT-10 | 1.8 |  | Brown, very hard, Calcareous, Sandy CLAY. | 15 | 17 | 24 | 34 | 75 | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 SPT-11 | | | | 16 | 20 | 43 | 35 | 98 | | | | | | | | | | | | | | | | | | |
| 12.00 | CRS-12 SPT-12 | 2.2 |  | Brown, moderately fractured, poor, hard, SHALE, with lenses of SILTSTONE at places. | 45 | 30/3 | | | R | | | | | | | | | | | | | | | | | | |
| 13.00 | CRS-13 SPT-13 | | | | 45 | 23/4 | | | R | | | | | | | | | | | | | | | | | | |
| 14.00 | CRS-14 SPT-14 | | | | 22 | 25 | No penetration | | R | | | | | | | | | | | | | | | | | | |
| 15.00 | CRS-15 SPT-15 | 5.5 |  | Brown, highly fractured, very poor, closely jointed, friable SANDSTONE, with lenses of SILTSTONE and LIMESTONE at places | 30 | 33 | 50/6cm | | R | | | | | | | | | | | | | | | | | | |
| 16.00 | CRS-16 SPT-16 | | | | 40 | 50/7cm | | R | | | | | | | | | | | | | | | | | | | |
| 17.00 | CRS-17 SPT-17 | | | | 50/10cm | | R | | | | | | | | | | | | | | | | | | | | |
| 18.00 | CRS-18 SPT-18 | | | | 50/7cm | | R | | | | | | | | | | | | | | | | | | | | |
| 19.00 | CRS-19 SPT-19 | | | | 50/6cm | | R | | | | | | | | | | | | | | | | | | | | |
| 20.00 | CRS-20 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-7

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2754303 | | Ground Water: 3.70m | | Borehole No: KCR/BH#4 | | | | | | | | | | | |
|--|------------|------------------------|-----------|--|---------|--------------------------|---------|------------------------|--------------|-----------------------------|----|----|----|----|---------|-----------|-------|--------------------|-----------|----------------------------|------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311722 | | Geologist: Efaz Danish | | Date Started: Apr-13-2012 | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +16.39 | | Driller: Misbah | | Date Completed: Apr-15-2012 | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | Remarks | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | | Core Recovery (cm) | R.Q.D (%) | Core Waxed for Testing (m) | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | From | To | | | From | to |
| 0.00 | | | | Brown, loose, fine, Sandy SILT, little concretion. | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 2.0 | | Brown, loose, fine, Sandy SILT, little concretion. | 5 | 2 | 2 | 3 | 7 | | | | | | 0.00 | 1.00 | 95 | NA | - | - | Dry Coring |
| 2.00 | SPT-1 | | | | | | | | | | | | | | | 1.00 | 2.00 | 86 | NA | - | - | Dry Coring |
| 3.00 | CRS-2 | 1.0 | | Brown, Stiff, Sandy Clayey SILT, trace to little, fine, Gravels. | 3 | 4 | 4 | 5 | 13 | | | | | | 2.00 | 3.00 | 88 | NA | - | - | |
| 4.00 | SPT-2 | | | | | | | | | | | | | | | 3.00 | 4.00 | 85 | NA | - | - |
| 5.00 | CRS-3 | 1.0 | | Brown, medium dense, medium to coarse, Silty SAND, trace to little Gravels. | 4 | 3 | 3 | 5 | 11 | | | | | | 4.00 | 5.00 | 85 | NA | - | - | |
| 6.00 | SPT-3 | | | | | | | | | | | | | | | 5.00 | 6.00 | 90 | NA | - | - |
| 7.00 | CRS-4 | 1.0 | | Brown, very Stiff, Silty CLAY, some Sand, little Gravels. | 8 | 7 | 8 | 9 | 24 | | | | | | 6.00 | 7.00 | 67 | NA | - | - | |
| 8.00 | SPT-4 | | | | | | | | | | | | | | | 7.00 | 8.00 | 86 | NA | 7.52 | 7.72 | Sample wax 20cm |
| 9.00 | CRS-5 | 1.0 | | Brown, medium dense, Clayey Silty SAND, little Gravels. | 4 | 5 | 6 | 7 | 18 | | | | | | 8.00 | 9.00 | 75 | Nil | - | - | |
| 10.00 | SPT-5 | | | | | | | | | | | | | | | 9.00 | 10.00 | 75 | Nil | - | - |
| 10.00 | CRS-6 | 1.0 | | Brown, very dense, medium to coarse, Silty SAND, little Gravels. | 20 | 28 | 26 | 23 | 77 | | | | | | | | | | | | |
| 10.00 | SPT-6 | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-7 | 1.0 | | Brown, very hard, Silty Sandy CLAY, trace Gravels. | 20 | 21 | 24 | 28 | 73 | | | | | | | | | | | | |
| 10.00 | SPT-7 | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-8 | 0.5 | | Brown, very dense, Silty SAND, with some Gravels | 13 | 12 | 17 | 25 | 54 | | | | | | | | | | | | |
| 10.00 | SPT-8 | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-9 | 1.0 | | Greyish brown, highly fractured, very poor, weak to medium hard, SILTSTONE, with interbedded Clay. | 59 | 50/5 | | | R | | | | | | | | | | | | |
| 10.00 | SPT-9 | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | 0.5 | | Greyish brown, highly fractured, very poor, friable SANDSTONE. | | | | | | | | | | | | | | | | | |

APP-2-2-10

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2754303 | | Ground Water: 3.70m | | Borehole No: KCR/BH#4 | | | | | | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|---|---------|------------------------|--------------|-----------------------------|----|----|----|----|---------|-----------|----|--------------------|-----------|----------------------------|----|--|--|-----------------|-----------------|-----------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311722 | | Geologist: Efaz Danish | | Date Started: Apr-13-2012 | | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +16.39 | | Driller: Misbah | | Date Completed: Apr-15-2012 | | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | Remarks | | | | | | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | From | To | | | From | To | | | | | |
| 10.00 | SPT-10 | 10 | | Reddish brown, highly fractured, very poor, oxidized, closely jointed, friable SANDSTONE. | 51/2 | | | | | R | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | | | | | | | | | | | | | | | | | | | | | | | Sample wax 12cm | | |
| | SPT-11 | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | Sample wax 11cm | |
| 12.00 | CRS-12 | | | | | Greyish brown, highly fractured, very poor, oxidized, closely jointed, friable SANDSTONE. | 20/1 | | | | | R | | | | | | | | | | | | | | |
| | SPT-12 | | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | |
| 13.00 | CRS-13 | | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | |
| | SPT-13 | | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | |
| 14.00 | CRS-14 | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | | Sample wax 10cm |
| | SPT-14 | | | | | | 20/1 | | | | | R | | | | | | | | | | | | | | |
| 15.00 | CRS-15 | | | | | | 10/0.5 | | | | | R | | | | | | | | | | | | | | |
| | SPT-15 | | | | 10/0.5 | | | | | R | | | | | | | | | | | | | | | | |
| 16.00 | CRS-16 | | | | 10/0.5 | | | | | R | | | | | | | | | | | | | | | | |
| | SPT-16 | | | | 10/0.5 | | | | | R | | | | | | | | | | | | | | | | |
| 17.00 | CRS-17 | | | | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| | SPT-17 | | | | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| 18.00 | CRS-18 | | | | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| | SPT-18 | | | | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| 19.00 | CRS-19 | | | Reddish brown, highly fractured, very poor, oxidized, closely jointed, friable SANDSTONE. | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| | SPT-19 | | | | 15/1 | | | | | R | | | | | | | | | | | | | | | | |
| 20.00 | CRS-20 | | | Brown, slightly fractured, fair, oxidized, closely jointed friable SANDSTONE. | 15/1 | | | | | R | | | | | | | | | | | | | | Sample wax 22cm | | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-11

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2754821 | | Ground Water: 2.80m | | Borehole No: KCR/BH#5 | | | | | | | | |
|--|------------|-------------------------|-----------|---|---------|-------------------------|---------|------------------------|--------------|-----------------------------|----------|-----------------------|----|------|---------|-----------|--------------------|-----------|----------------------------|------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311744 | | Geologist: Efaz Danish | | Date Started: Apr-17-2012 | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: 17.66 | | Driller: Misba | | Date Completed: Apr-19-2012 | | | | | | | | | | |
| Depth (m) | Sample No. | Thick-ness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | CORE RUN | | | | Remarks | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | | | | From | To | From | to |
| 0.00 | | 0.6 | ■■■■■ | Brown, oxidized, fine to medium, Silty SAND, trace Concretion. | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 0.4 | ■■■■■ | Greyish black, fine to medim, Clayey Silty SAND, intermix organic material. | | | | | | | | | | | | | | | | |
| | SPT-1 | | ■■■■■ | Brown to brownish grey, stiff to very stiff, Sandy Clayey SILT. | 5 | 3 | 4 | 4 | 11 | | | | | | 0.00 | 1.00 | 80 | NA | - | - |
| 2.00 | CRS-2 | | ■■■■■ | | | | | | | | | | | | 1.00 | 2.00 | 89 | NA | - | - |
| | SPT-2 | | ■■■■■ | | | | | | | | | | | | 2.00 | 3.00 | 88 | NA | 2.75 | 2.9 |
| 3.00 | CRS-3 | | ■■■■■ | | | | | | | | | | | | 3.00 | 4.00 | 85 | NA | - | - |
| | SPT-3 | | ■■■■■ | | | | | | | | | | | 4.00 | 5.00 | 73 | Nil | - | - | |
| 4.00 | CRS-4 | 0.4 | ■■■■■ | Brown, medium dense, medium to coarse, Clayey SAND, little Gravels. | 2 | 7 | 7 | 8 | 22 | | | | | | 3.00 | 4.00 | 85 | NA | - | - |
| | SPT-4 | | ■■■■■ | Brown, highly fractured, very poor, highly weathered, hard, LIMESTONE. | | | | | | | | | | | 4.00 | 5.00 | 73 | Nil | - | - |
| 5.00 | CRS-5 | | ■■■■■ | | | | | | | | | | | | 5.00 | 6.00 | 76 | Nil | - | - |
| | SPT-5 | | ■■■■■ | | | | | | | | | | | | 6.00 | 7.00 | 78 | Nil | - | - |
| 6.00 | CRS-6 | 2.2 | ■■■■■ | | | | | | | | | | | 7.00 | 8.00 | 85 | 14 | 7.67 | 7.81 | |
| | SPT-6 | | ■■■■■ | | | | | | | | | | | 8.00 | 9.00 | 83 | 15 | 8.71 | 8.88 | |
| 7.00 | CRS-7 | | ■■■■■ | Greyish brown, highly fractured, very poor, oxidized, friable SANDSTONE. | 35 | 16 | 20 | 30 | 66 | | | | | | 6.00 | 7.00 | 78 | Nil | - | - |
| | SPT-7 | | ■■■■■ | | | | | | | | | | | 7.00 | 8.00 | 85 | 14 | 7.67 | 7.81 | |
| 8.00 | CRS-8 | 3.6 | ■■■■■ | | | | | | | | | | | 8.00 | 9.00 | 83 | 15 | 8.71 | 8.88 | |
| | SPT-8 | | ■■■■■ | | | | | | | | | | | 9.00 | 10.00 | 70 | 12 | - | - | |
| 9.00 | CRS-9 | | ■■■■■ | Brownish grey, highly fractured, very poor, limonitic, friable SANDSTONE | 50/10cm | | | | R | | | | | | 8.00 | 9.00 | 83 | 15 | 8.71 | 8.88 |
| | SPT-9 | | ■■■■■ | | | | | | | | | | | | 9.00 | 10.00 | 70 | 12 | - | - |
| 10.00 | CRS-10 | | ■■■■■ | | | | | | | | | | | 9.00 | 10.00 | 70 | 12 | - | - | |

APP-2-2-12

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2754821 | | Ground Water: 2.80m | | Borehole No: KCR/BH#5 | | | | | | | | | | | |
|--|------------|---------------------------|-----------|--|---------|-------------------------|---------|------------------------|--------------|-----------------------------|----|-----------------------|----|-------|-----------|-------|---------------------|-----------|---------|----------------------------|-----------------|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311744 | | Geologist: Efaz Danish | | Date Started: Apr-17-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: 17.66 | | Driller: Misba | | Date Completed: Apr-19-2012 | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick. kness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | | | | | CORE RUN | | | | Remarks | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (C.m) | R.Q.D (%) | | Core Waxed for Testing (m) | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | |
| 10.00 | SPT-10 | 0.4 | [Pattern] | Yellowish brown, highly fractured, very poor, friable SANDSTONE. | 50/8cm | | | | | R | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 2.2 | [Pattern] | Brown, moderately fractured, fair, medium hard, MUDSTONE, interlayered with SHALE | 50/12cm | | | | | R | | | | | 10.00 | 11.00 | 78 | 16 | 10.60 | 10.76 | Sample wax 16cm | | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | 11.00 | 12.00 | 74 | 66 | 11.63 | 11.80 | Sample wax 17cm | | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | 12.00 | 13.00 | 75 | 30 | - | - | | | |
| 14.00 | CRS-14 | 7.2 | [Pattern] | Reddish brown, fractured, horizontally jointed, friable SANDSTONE, traces of Mica. | 50/5cm | | | | | R | | | | 13.00 | 14.00 | 70 | 21 | - | - | | | | |
| 15.00 | CRS-15 | | | Brown to greyish brown, highly fractured, very poor, weak, friable SANDSTONE. | 50/4cm | | | | | | R | | | | 14.00 | 15.00 | 70 | Nil | - | - | | | |
| 16.00 | CRS-16 | | | 15.00 | 16.00 | 70 | Nil | - | - | | | | | | | | | | | | | | |
| 17.00 | CRS-17 | | | 16.00 | 17.00 | 71 | Nil | - | - | | | | | | | | | | | | | | |
| 18.00 | CRS-18 | | | 17.00 | 18.00 | 70 | 11 | 17.59 | 17.70 | Sample wax 11cm | | | | | | | | | | | | | |
| 19.00 | CRS-19 | | | 18.00 | 19.00 | 100 | 90 | 18.40 | 18.65 | Sample wax 25cm | | | | | | | | | | | | | |
| 20.00 | CRS-20 | | | 19.00 | 20.00 | 70 | Nil | - | - | | | | | | | | | | | | | | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-13

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2755288 | | Ground Water: 1.80m | | Borehole No: KCR/BH#6 | | | | | | | | | | | | |
|--|----------------|---------------------------|-----------|---|---------|--------------------------|---------|------------------------|--------------|-----------------------------|----------|-----------------------|----|----|---------|-----------|--------------------|-----------|----------------------------|----|------|----|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311719 | | Geologist: Efaz Danish | | Date Started: Apr-19-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +18.57 | | Driller: Qaim | | Date Completed: Apr-21-2012 | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick. kness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | CORE RUN | | | | Remarks | | | | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | | | | From | To | From | to | | |
| 0.00 |  |  | ..... | Brown, loose, Silty SAND, little concretion, and little calcareous nodules. | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | 2.0 | ..... |  | 3 | 3 | 3 | 4 | 10 | | | | | | 0.00 | 1.00 | 92 | NA | - | - | | | | |
| 2.00 | CRS-2 SPT-2 |  | ..... | Brownish grey, medium dense, fine to medium, Silty SAND. | 4 | 4 | 5 | 5 | 14 | | | | | | 1.00 | 2.00 | 90 | NA | - | - | | | | |
| 3.00 | CRS-3 SPT-3 | 2.0 | ..... |  | 7 | 7 | 9 | 10 | 26 | | | | | | 2.00 | 3.00 | 89 | NA | - | - | | | | |
| 4.00 | CRS-4 SPT-4 |  | ..... |  | 29 | 18 | 21 | 30 | 69 | | | | | | 3.00 | 4.00 | 90 | 18 | - | - | | | | |
| 5.00 | CRS-5 SPT-5 |  | ..... | Brown, highly fractured, very poor, moderately weathered, friable SANDSTONE, with Clay as matrix. | 52/6cm | | | | R | | | | | | 4.00 | 5.00 | 85 | Nil | - | - | | | | |
| 6.00 | CRS-6 SPT-6 | 3.0 | ..... |  | 52/11cm | | | | R | | | | | | 5.00 | 6.00 | 81 | 13 | - | - | | | | |
| 7.00 | CRS-7 SPT-7 |  | ..... |  | 30/10cm | | | | R | | | | | | 6.00 | 7.00 | 70 | Nil | - | - | | | | |
| 8.00 | CRS-8 |  | ..... | Yellowish brown, highly fractured, very poor, weathered, horizontal joints, medium hard, SANDSTONE. | | | | | | | | | | | 7.00 | 8.00 | 71 | Nil | - | - | | | | |
| 9.00 | CRS-9 | 3.0 | ..... |  |  |  |  |  |  |  |  |  |  |  | 8.00 | 9.00 | 70 | Nil | - | - | | | | |
| 10.00 | CRS-10 |  | ..... |  |  |  |  |  |  |  |  |  |  |  | 9.00 | 10.00 | 70 | Nil | - | - | | | | |

#1-2-2-11

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2755288 | | Ground Water: 1.80m | | Borehole No: KCR/BH#6 | | | | | | | | | | | | | |
|--|------------|-------------------------|-----------|--|---------|--------------------------|---------|------------------------|--------------|-----------------------------|----|-----------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|-----|----|-------|-------|-----------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311719 | | Geologist: Efaz Danish | | Date Started: Apr-19-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +18.57 | | Driller: Qaim | | Date Completed: Apr-21-2012 | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick-ness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | | | | | CORE RUN | | | | Remarks | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | | Core Waxed for Testing (m) | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | | | |
| 10.00 | | 1.3 | [Pattern] | Brown, highly fractured, very poor, fine to medium grained, friable SANDSTONE. | | | | | | | | | | | | | | | 10.00 | 11.00 | 72 | 13 | 10.47 | 10.60 | Sample wax 13cm |
| 11.00 | CRS-11 | | | | | | | | | | | | | | | | | | 11.00 | 12.00 | 98 | 50 | 11.30 | 11.52 | Sample wax 22cm |
| 12.00 | CRS-12 | | [Pattern] | Brown, moderately fractured, fair, medium hard, SHALE, with lenses of SILTSTONE at places. | | | | | | | | | | | | | | | 12.00 | 13.00 | 100 | 68 | 12.48 | 12.60 | Sample wax 12cm |
| 13.00 | CRS-13 | 3.7 | | | | | | | | | | | | | | | | | 13.00 | 14.00 | 81 | 55 | 13.43 | 13.60 | Sample wax 17cm |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | | | 14.00 | 15.00 | 100 | 93 | 14.22 | 14.40 | Sample wax 18cm |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-15

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2755742 | | Ground Water: 1.80m | | Borehole No: KCR/BH#07 | | | | | | | | | | | | | |
|--|------------|------------------------|-----------|--|---------|--------------------------|---------|------------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|---------|--------------------|-----------|----------------------------|------|------|----|-----------------|-----------------|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311652 | | Geologist: Efaz Danish | | Date Started: Apr-16-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +22.32 | | Driller: Qaim | | Date Completed: Apr-18-2012 | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | | CORE RUN | | | | Remarks | | | | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | | | | From | To | From | to | | | |
| 0.00 | | 1.0 | ■■■■ | Brown, loose, Sandy SILT, little Gravels. | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-1 | 1.0 | ▽ | Brown, loose, Clayey SAND, little Gravels. | 5 | 3 | 2 | 3 | 8 | | | | | | 0.00 | 1.00 | 95 | NA | - | - | | | | | |
| 2.00 | CRS-2 | | ▽ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-2 | 0.5 | ■■■■ | Brown, dense, medium to coarse, Silty SAND, little Gravels. | 5 | 4 | 11 | 16 | 31 | | | | | | 1.00 | 2.00 | 80 | NA | - | - | | | | | |
| 3.00 | CRS-3 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-3 | | ■■■■ | | 20 | 22 | 23 | 29 | 74 | | | | | | 2.00 | 3.00 | 80 | Nil | - | - | | | | | |
| 4.00 | CRS-4 | | ■■■■ | Brown, highly fractured, very poor, weathered, fine to medium grained, medium hard, SANDSTONE, with Clay Matrix. | | | | | | | | | | | | | | | | | | | | | |
| | SPT-4 | 3.5 | ■■■■ | | | 54 | 50/3cm | | | R | | | | | | 3.00 | 4.00 | 75 | Nil | - | - | | | | |
| 5.00 | CRS-5 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-5 | | ■■■■ | | | 50/7cm | | | | R | | | | | | 4.00 | 5.00 | 75 | Nil | - | - | | | | |
| 6.00 | CRS-6 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-6 | | ■■■■ | | 52/12 | | | | R | | | | | | 5.00 | 6.00 | 70 | Nil | - | - | | | | | |
| 7.00 | CRS-7 | | ■■■■ | Greyish brown, fractured to highly fractured, very poor, closely jointed, friable SANDSTONE (joints are generally horizontal and between 7-8m depth) | | | | | | | | | | | | | | | | | | | | | |
| | SPT-7 | | ■■■■ | | | 52/5 | | | | R | | | | | | 6.00 | 7.00 | 75 | 31 | 6.30 | 6.43 | | | Sample wax 13cm | |
| 8.00 | CRS-8 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-8 | 4.0 | ■■■■ | | | | | | | | | | | | | 7.00 | 8.00 | 77 | 11 | 7.45 | 7.56 | | | Sample wax 11cm | |
| 9.00 | CRS-9 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-9 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | | ■■■■ | | | | | | | | | | | | | | | | | | | | | | |
| | SPT-10 | | ■■■■ | | | | | | | | | | | | 9.00 | 10.00 | 75 | 13 | 9.25 | 9.38 | | | Sample wax 13cm | | |

APP-2-2-16

SPT: Standard Penetration Test CRS : Core Sample CR: Core Recovery RQD: Rock Quality Designation, DS: Disturb Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

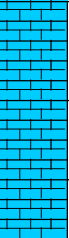

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2756029 | | Ground Water: 2.50 | | Borehole No: KCR/BH#8 | | | | | | | | | | | | |
|--|----------------|------------------------|-----------|--|---------|--------------------------|---------|--------------------|--------------|-----------------------------|----|----|----|----|-----------|---------|--------------------|-----------|----------------------------|------|-----------------|-----------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311335 | | Geologist: Yasir | | Date Started: Apr-13-2012 | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +25.81 | | Driller: Allah Bux | | Date Completed: Apr-15-2012 | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | | Remarks | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | | | | To | From | to | |
| 0.00 | | | | Brown, very dense, fine to medium, Silty SAND, trace Gravels. | | | | | | | | | | | | 0.00 | 1.00 | 97 | NA | - | - | Dry Coring |
| 1.00 | CRS-1 SPT-1 | 2.6 | | | 4 | 14 | 23 | 17 | 54 | | | | | | | 1.00 | 2.00 | 95 | NA | - | - | |
| 2.00 | CRS-2 SPT-2 | | | | 8 | 8 | 9 | 51 | 68 | | | | | | | 2.00 | 3.00 | 77 | 10 | 2.43 | 2.54 | Sample wax 11cm |
| 3.00 | CRS-3 SPT-3 | 0.7 | ..... | Brown, highly fractured, very poor, closely jointed, medium to hard, SANDSTONE | 50/15 | | | | R | | | | | | 3.00 | 4.00 | 88 | 34 | 3.58 | 3.82 | | |
| 4.00 | CRS-4 SPT-4 | 0.6 | | Brown, highly fractured, poor, closely jointed, medium to hard, coquina LIMESTONE. | 10 | 18 | 27 | 45 | 90 | | | | | | 4.00 | 5.00 | 92 | Nil | - | - | Sample wax 24cm | |
| 5.00 | CRS-5 SPT-5 |  | ..... | Brown, highly fractured, very poor, poorly weathered, medium hard to hard, SHALE | 20 | 36 | 50 | - | R | | | | | | 5.00 | 6.00 | 98 | 45 | 5.73 | 5.86 | | |
| 6.00 | CRS-6 SPT-6 | | | Brown, highly fractured, fair, poorly weathered, medium hard to hard, SHALE | 17 | 30 | 40/3cm | | R | | | | | | 6.00 | 7.00 | 87 | 47 | 6.5 | 6.63 | Sample wax 13cm | |
| 7.00 | CRS-7 SPT-7 | 5.9 | ..... |  | 21 | 27 | 50/8cm | | R | | | | | | 7.00 | 8.00 | 97 | 54 | - | - | | |
| 8.00 | CRS-8 SPT-8 |  | ..... |  | 21 | 31 | 50 | | R | | | | | | 8.00 | 9.00 | 88 | 30 | - | - | | |
| 9.00 | CRS-9 SPT-9 | | | | 18 | 30 | 50/7cm | | R | | | | | | 9.00 | 10.00 | 90 | 16 | 9.48 | 9.58 | Sample wax 10cm | |
| 10.00 | CRS-10 | 0.2 | ..... | Brown, highly fractured, very poor, LIMESTONE | | | | | | | | | | | | | | | | | | |

APP-2-2-18

SPT: Standard Penetration Test CRS : Core Sample CR: Core Recovery RQD: Rock Quality Designation, DS: Disturb Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2756029 | | Ground Water: 2.50 | | Borehole No: KCR/BH#8 | | | | | | | | | | | | | | |
|--|------------|------------------------|---|--|---------|--------------------------|---------|--------------------|--------------|-----------------------------|----|----|----|----|---------|-----------|----|--------------------|-----------|----------------------------|----|--|-----------------|-----------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R311335 | | Geologist: Yasir | | Date Started: Apr-13-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +25.81 | | Driller: Allah Bux | | Date Completed: Apr-15-2012 | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | Remarks | | | | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | From | To | | | From | to | | | |
| 10.00 | SPT-10 | 2.8 |  | Grey, moderately fractured, poor, weathered, closely jointed, hard, fossiliferous LIMESTONE | 50/10cm | | | | | R | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | | | Grey, highly fractured, very poor, weathered, closely jointed, hard, fossiliferous LIMESTONE, with lenses of SANDSTONE | | | | | | | | | | | | | | | | | | | Sample wax 16cm | |
| 12.00 | CRS-12 | | | Grey, highly fractured, very poor, weathered, closely jointed, hard, fossiliferous LIMESTONE. | | | | | | | | | | | | | | | | | | | | Sample wax 13cm |
| 13.00 | CRS-13 | 2.2 |  | Grey, slightly fractured, fair, closely jointed, medium hard to hard, SILTSTONE | | | | | | | | | | | | | | | | | | | | |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | | | | | | | | Sample wax 18cm |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | | | | | | |
| END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-19

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2756069 | | Ground Water: 0.60 | | Borehole No: KCR/BH#9 | | | | | | | | | | | |
|--|----------------|------------------------|--|---|---------|--------------------------|---------|--------------------|--------------|-----------------------------|----|----|----|----|---------|-----------|-----|--------------------|-----------|----------------------------|-----------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R310832 | | Geologist: Muneer | | Date Started: Apr-11-2012 | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +26.76 | | Driller: Qaim | | Date Completed: Apr-14-2012 | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickness of Layer (m) | Lithology | Stratum Description | SPT | | | | | CORE RUN | | | | | Remarks | | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | Core Waxed for Testing (m) | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | | From | To | | | From | to |
| 0.00 | | | ▽..... | Brown, dense to very dense, fine to coarse, Silty SAND, little Gravels. | | | | | | | | | | | 0.00 | 1.00 | 90 | NA | | | Dry coring |
| 1.00 | CRS-1 SPT-1 | 2.5 | | | 7 | 13 | 15 | 15 | 43 | | | | | | 1.00 | 2.00 | 92 | NA | | | |
| 2.00 | CRS-2 SPT-2 | | ▽..... | | 24 | 17 | 22 | 24 | 63 | | | | | | 1.00 | 2.00 | 92 | NA | | | |
| 3.00 | CRS-3 CPT-1 | 1.5 | ..... ..... ..... ..... ..... | Brown, highly fractured, very poor, highly weathered, medium to hard, LIMESTONE. | 50/3cm | | | | | R | | | | | 2.00 | 3.00 | 94 | Nil | | | |
| 4.00 | CRS-4 | | | | | | | | | | | | | | 3.00 | 4.00 | 50 | Nil | | | |
| 5.00 | CRS-5 SPT-3 |  | ..... ..... ..... ..... ..... | Brownish grey to grey, fractured, very poor to poor, medium hard, SHALE. | | | | | | | | | | | 4.00 | 5.00 | 80 | 34 | | | |
| 6.00 | CRS-6 SPT-4 | 4 | | | | | | | | | | | | | 5.00 | 6.00 | 88 | 13 | 5.26 | 5.36 | Sample wax 10cm |
| 7.00 | CRS-7 SPT-5 | | | | | | | | | | | | | | 6.00 | 7.00 | 72 | 10 | | | |
| 8.00 | CRS-8 SPT-6 | | | | | | | | | | | | | | 7.00 | 8.00 | 98 | 42 | 7.45 | 7.6 | Sample wax 15cm |
| 9.00 | CRS-9 SPT-7 | 2 | ..... ..... ..... ..... ..... | Brownish grey, fractured, very poor, horizontally jointed, hard, CLAYSTONE, with interlayered of SHALE. | | | | | | | | | | | 8.00 | 9.00 | 100 | 13 | | | |
| 10.00 | CRS-10 | | | | | | | | | | | | | | 9.00 | 10.00 | 100 | 15 | 9.15 | 9.23 | Sample wax 8cm |

APP-2-2-20

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| Client: The JICA Study Team | | Type of Boring: Rotary | | Co-ordinate: | | N: 2755963 | | Ground Water: 0.0m | | Borehole No: KCR/BH#11 | | | | | | | | | | | | | | |
|--|------------|---------------------------|-----------|---|---------|------------------------|---------|----------------------------|--------------|------------------------|----|----|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|---|---|---|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | Machine Make: Russian | | E: 42R309854 | | Geologist: Syed Faisal | | Date Started: May-06-2012 | | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | Drilling Fluid: Bentonite | | Ground Elevation: +32.6 | | Driller: Yameen | | Date Completed: May-8-2012 | | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick kness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | | | | | CORE RUN | | | | Remarks | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | | Core Waxed for Testing (m) | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | | |
| 0.00 | | 1.0 | ▽▽▽▽ | Greyish brown, GRAVELS and BOULDERS, (as filled material) | | | | | | | | | | | | | | 0.00 | 1.00 | 78 | NA | - | - | Drilling Start at Underwater location (Water depth 5ft) |
| 1.00 | CRS-1 | | | | | | | | | | | | | | | | 1.00 | 2.00 | 70 | Nil | - | - | | |
| 2.00 | CRS-2 | 4.0 | ▣▣▣▣ | Yellowish brown, highly fractured, very poor, closely jointed, weathered, medium hard to hard, Sandy LIMESTONE. | | | | | | | | | | | | | 2.00 | 3.00 | 70 | Nil | - | - | | |
| 3.00 | CRS-3 | | | | | | | | | | | | | | | | 3.00 | 4.00 | 65 | Nil | - | - | | |
| 4.00 | CRS-4 | | | | | | | | | | | | | | | | 4.00 | 5.00 | 60 | Nil | - | - | | |
| 5.00 | CRS-5 | 0.3 | ▣▣▣▣ | Yellowish grey, very poor, medium hard, Sandy SHALE. | | | | | | | | | | | | | 5.00 | 6.00 | 65 | Nil | - | - | | |
| 6.00 | CRS-6 | 1.1 | ▣▣▣▣ | Grey, highly fractured, very poor, closely jointed, medium hard, LIMESTONE, with lenses of SHALE | | | | | | | | | | | | | 6.00 | 7.00 | 70 | Nil | - | - | | |
| 7.00 | CRS-7 | 2.6 | ▣▣▣▣ | Grey, highly fractured, very poor, medium hard, SHALE, interbedded with highly fractured, friable SANDSTONE | | | | | | | | | | | | | 7.00 | 8.00 | 70 | Nil | - | - | | |
| 8.00 | CRS-8 | | ▣▣▣▣ | | | | | | | | | | | | | | 8.00 | 9.00 | 60 | 11 | - | - | | |
| 9.00 | CRS-9 | 1.0 | ▣▣▣▣ | Grey, highly fractured, very poor, weak, closely jointed, friable SANDSTONE, with lenses of SHALE | | | | | | | | | | | | | 9.00 | 10.00 | 70 | Nil | - | - | | |

APP-2-2-24

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2755963 | | Ground Water: 0.0m | | Borehole No: KCR/BH#11 | | | | | | | | | | | | |
|--|------------|---------------------------|-----------|--|---------|-------------------------|---------|------------------------|--------------|----------------------------|----|------------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|--|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R309854 | | Geologist: Syed Faisal | | Date Started: May-06-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +32.6 | | Driller: Yameen | | Date Completed: May-8-2012 | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick. kness of Layer (m) | Lithology | Stratum Description | SPT | | | | | | | | | | CORE RUN | | | | Remarks | | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | | Core Waxed for Testing (m) | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | | |
| 10.00 | | | SANDSTONE | Grey, highly fractured, very poor, loosely cemented closely jointed, friable SANDSTONE | | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 2.0 | | | | | | | | | | | | | | | | | | | | | | |
| 12.00 | CRS-12 | | SHALE | Grey, highly fractured, poor, medium hard, SHALE, interbedded with friable SANDSTONE. | | | | | | | | | | | | | | | | | | | | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | | | | | | | |
| 14.00 | CRS-14 | 3.0 | | | | | | | | | | | | | | | | | | | | | | |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | | | |

APP-2-2-25

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2756299 | | Ground Water: 0.0m | | Borehole No: KCR/BH#12 | | | | | | | | | | | |
|--|------------|------------|--|---|---------|--------------------------|---------|---------------------|--------------|----------------------------|----|------------------------|----|----|-----------|-------|--------------------|-----------|---------|----------------------------|-----|-------|-------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R309555 | | Geologist: M. Noman | | Date Started: Apr-27-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +31.54 | | Driller: Allah Bux | | Date Completed: May-1-2012 | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick. (m) | Lithology | Stratum Description | SPT | | | | | | | | | | CORE RUN | | | | Remarks | | | | |
| | | | | | 15 (cm) | 10 (cm) | 10 (cm) | 10 (cm) | N Blows 30cm | Graph N/30 cm | | | | | Depth (m) | | Core Recovery (Cm) | R.Q.D (%) | | Core Waxed for Testing (m) | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | |
| 10.00 | | | (lenses of fossiliferous Sandy LIMESTONE at 12-13cm) | Brownish grey, highly fractured, very poor, highly weathered, soft to medium hard, Sandy SHALE, | | | | | | | | | | | | 10.00 | 11.00 | 96 | 10 | - | - | | |
| 11.00 | CRS-11 | 4.3 | | | | | | | | | | | | | | | 11.00 | 12.00 | 95 | Nil | - | - | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | | 12.00 | 13.00 | 92 | Nil | - | - |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | 13.00 | 14.00 | 94 | 10 | - | - |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | | 14.00 | 15.00 | 89 | 36 | 14.48 | 14.66 |
| 15.00 | CRS-15 | 0.7 | | Brownish Grey, fractured, poor, Slightly weathered, horizontally jointed, friable SANDSTONE. | | | | | | | | | | | | | | | | | | | |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | | |

APP-2-2-27

SPT: Standard Penetration Test CRS : Core Sample CR:Core Recovery RQD:Rock Quality Designation, DS: Disturbe Sample, SL: Sample Length

