

SUBSURFACE EXPLORATION LOG FIELD DATA

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2748844 | | Ground Water: 5.30m | | Borehole No: KCR/BH#65 | | | | | | | | | | | |
|--|------------|--------------------------|-----------|--|--|-------------------------|---------|---------------------|--------------|------------------------------|----|------------------------|----|----|-----------|-------|---------------------|-----------|---------|----------------------------|-------------------|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R300821 | | Geologist: M. Irfan | | Date Started: June-05-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +3.49 | | Driller: M. Murad | | Date Completed: June-07-2012 | | | | | | | | | | | | | |
| 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 | | | | Brown, highly fractured, very poor, highly weathred, Sandy SHALE, with lenses of SILTSTONE | | | | | | | | | | | | | 10.00 | 11.00 | 75 | 19 | - | - | |
| 11.00 | CRS-11 | 2.0 | | | | | | | | | | | | | | | 11.00 | 12.00 | 89 | 80 | 11.60 | 11.77 | Sample Waxed 17cm |
| 12.00 | CRS-12 | | | Brown, moderately fractured, poor, horizontally jointed, medium hard, SILTSTONE | | | | | | | | | | | | 12.00 | 13.00 | 70 | 37 | 12.16 | 12.37 | Sample Waxed 21cm | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | 13.00 | 14.00 | 70 | 31 | 13.30 | 13.48 | Sample Waxed 16cm | |
| 14.00 | CRS-14 | 4.0 | | | | | | | | | | | | | | 14.00 | 15.00 | 65 | 12 | 14.12 | 14.33 | Sample Waxed 21cm | |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | 15.00 | 16.00 | 70 | 10 | - | - | | |
| 16.00 | CRS-16 | | | | Brown, slightly fractured, good, horizontally & diagonally jointed, medium hard to hard, SILTSTONE | | | | | | | | | | | | 16.00 | 17.00 | 79 | 76 | 16.32 | 16.45 | Sample Waxed 13cm |
| 17.00 | CRS-17 | 1.0 | | | | | | | | | | | | | | 17.00 | 18.00 | 70 | 35 | 17.10 | 17.35 | Sample Waxed 25cm | |
| 18.00 | CRS-18 | 2.4 | | Brown, moderately fractured, poor, horizontally jointed, meidum hard, SILTSTONE, with lenses of Sandstone. | | | | | | | | | | | 18.00 | 19.00 | 65 | 25 | 18.28 | 18.41 | Sample Waxed 13cm | | |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | 19.00 | 20.00 | 75 | 23 | - | - | | |
| 20.00 | CRS-20 | 0.6 | | Grey, highly fractured, very poor, horizontally jointed, medium hard to hard, SILTSTONE . | | | | | | | | | | | 19.00 | 20.00 | 75 | 23 | - | - | | | |

APP-2-2-150

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

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2748844 | | Ground Water: 5.30m | | Borehole No: KCR/BH#65 | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|---------------------|--------------|------------------------------|----|------------------------|----|-------|-----------|-------|--------------------|-----------|---------|----------------------------|-------------------|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R300821 | | Geologist: M. Irfan | | Date Started: June-05-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +3.49 | | Driller: M. Murad | | Date Completed: June-07-2012 | | | | | | | | | | | | | |
| 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 | | |
| 20.00 | | | ***** | Grey, slightly fractured, fair to good, horizontally jointed, medium hard to hard, SILTSTONE, with lenses of SANDSTONE. | | | | | | | | | | | | | | | | | | | |
| 21.00 | CRS-21 | 2.5 | ***** | | | | | | | | | | | | 20.00 | 21.00 | 80 | 78 | 20.10 | 20.24 | Sample Waxed 14cm | | |
| 22.00 | CRS-22 | | ***** | | | | | | | | | | | | 21.00 | 22.00 | 77 | 75 | 21.00 | 21.29 | Sample Waxed 29cm | | |
| 23.00 | CRS-23 | 1.0 | ***** | Grey, moderately fractured, fair, medium hard to hard, SHALE. | | | | | | | | | | | | | | | | | | | |
| 24.00 | CRS-24 | | ***** | | | | | | | | | | | | 22.00 | 23.00 | 70 | 56 | 22.39 | 22.55 | Sample Waxed 16cm | | |
| 25.00 | CRS-25 | | ***** | Grey, slightly to moderately fractured, fair to good, horizontally jointed, hard, SILTSTONE, with lenses of SHALE at places, trace fossils. | | | | | | | | | | | | | | | | | | | |
| 26.00 | CRS-26 | | ***** | | | | | | | | | | | | 23.00 | 24.00 | 90 | 53 | 23.48 | 23.78 | Sample Waxed 30cm | | |
| 27.00 | CRS-27 | 6.5 | ***** | | | | | | | | | | | | 24.00 | 25.00 | 80 | 78 | 24.00 | 24.28 | Sample Waxed 28cm | | |
| 28.00 | CRS-28 | | ***** | | | | | | | | | | | | 25.00 | 26.00 | 70 | 68 | 26.00 | 26.32 | Sample Waxed 23cm | | |
| 29.00 | CRS-29 | | ***** | | | | | | | | | | | | 26.00 | 27.00 | 70 | 63 | 26.33 | 26.53 | Sample Waxed 27cm | | |
| 30.00 | CRS-30 | | ***** | | | | | | | | | | | | 27.00 | 28.00 | 85 | 84 | - | - | | | |
| | | | | END OF BOREHOLE AT 30.0m Depth | | | | | | | | | | 28.00 | 29.00 | 70 | 52 | 28.56 | 28.69 | Sample Waxed 13cm | | | |
| | | | | | | | | | | | | | | 29.00 | 30.00 | 80 | 52 | 29.00 | 29.20 | Sample Waxed 22cm | | | |

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

APP-2-2-151

SUBSURFACE EXPLORATION LOG FIELD DATA

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2748776 | | Ground Water: 3.05m | | Borehole No: KCR/BH#66 | | | | | | | | | | | | |
|--|----------------|--------------------------|-----------|---|---------|-------------------------|---------|------------------------|--------------|-----------------------------|----|------------------------|----|------|-----------|------|--------------------|-----------|---------|----------------------------|-------------------|------------|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R301220 | | Geologist: Efaz Danish | | Date Started: June-3-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +5.15 | | Driller: Misbah | | Date Completed: June-7-2012 | | | | | | | | | | | | | | |
| 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 | | 0.3 | | Asphalt with Stone pieces (water bond makadam). | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | 1.7 | | Brown, medium dense, Sandy GRAVELS, some Silt (as filled material). | 6 | 4 | 6 | 2 | 12 | | | | | | | 0.00 | 1.00 | 90 | NA | - | - | Dry Coring | | |
| 2.00 | CRS-2 SPT-2 | | | | 7 | 8 | 12 | 12 | 32 | | | | | | 1.00 | 2.00 | 75 | NA | - | - | | | | |
| 3.00 | CRS-3 SPT-3 | | | Brown, very hard, Silty CLAY, some fine to medium Sand and Some Gravels | 12 | 11 | 12 | 15 | 38 | | | | | | 2.00 | 3.00 | 85 | NA | - | - | | | | |
| 4.00 | CRS-4 SPT-4 | | | | 20/5cm | | | | | R | | | | | 3.00 | 4.00 | 60 | NA | - | - | | | | |
| 5.00 | CRS-5 SPT-5 | 6.0 | | | 6 | 10 | 17 | 17 | 44 | | | | | | 4.00 | 5.00 | 45 | NA | - | - | | | | |
| 6.00 | CRS-6 SPT-6 | | | | 31/10cm | | | | | R | | | | | 5.00 | 6.00 | 85 | NA | - | - | | | | |
| 7.00 | CRS-7 SPT-7 | | | 19 | 28 | 30/5cm | | | R | | | | | 6.00 | 7.00 | 80 | NA | 6.35 | 6.55 | Sample Waxed 20cm | | | | |
| 8.00 | CRS-8 SPT-8 | 0.5 | | 30/2cm | | | | | R | | | | | 7.00 | 8.00 | 85 | NA | - | - | | | | | |
| 9.00 | CRS-9 SPT-9 | 1.5 | | 30/3cm | | | | | R | | | | | 8.00 | 9.00 | 85 | 26 | 8.35 | 8.45 | | Sample Waxed 10cm | | | |
| 10.00 | CRS-10 | | | | | | | | | | | | | 9.00 | 10.00 | 60 | 38 | 9.79 | 9.97 | Sample Waxed 19cm | | | | |

APP-2-2-152

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 3

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2748776 | | Ground Water: 3.05m | | Borehole No: KCR/BH#66 | | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|------------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|--|--|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R301220 | | Geologist: Efaz Danish | | Date Started: June-3-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +5.15 | | Driller: Misbah | | Date Completed: June-7-2012 | | | | | | | | | | | | | | |
| 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 | | | Brown, highly fractured, poor, medium hard, moderately weathered, medium hard, SHALE, intermix with Sand. | 21 | 25 | 35 | 35/5cm | R | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 2.0 | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 20cm |
| | SPT-11 | | | | | | | | R | | | | | | | | | | | | | | | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 13cm |
| 13.00 | CRS-13 | 2.0 | | Brown, highly fractured, poor, moderately to closely jointed, medium hard, SILTSTONE. | | | | | | | | | | | | | | | | | | | | Sample Waxed 14cm |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 10cm |
| 15.00 | CRS-15 | | | Brown, moderately fractured, good, moderately jointed, medium hard, Sandy SILTSTONE. | | | | | | | | | | | | | | | | | | | | Sample Waxed 20cm |
| 16.00 | CRS-16 | 3.0 | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 12cm |
| 17.00 | CRS-17 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 15cm |
| 18.00 | CRS-18 | 1.8 | | Greyish brown, highly fractured, very poor, closely jointed, medium hard, Sandy SILTSTONE. | | | | | | | | | | | | | | | | | | | | |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | | | | | | | | | |
| 20.00 | CRS-20 | 1.2 | | Brownish red, moderately fractured, good, slightly jointed, Oxidized, medium hard, MUDSTONE. | | | | | | | | | | | | | | | | | | | | Sample Waxed 12cm |

APP-2-2-153

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

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 3 of 3

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2748776 | Ground Water: 3.05m | | Borehole No: KCR/BH#66 | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|------------------------|---------------------|-----------------------------|------------------------|----|----|---------|-----------|-------|--------------------|-----------|------------------------|-------------------|-------------------|----|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R301220 | | Geologist: Efaz Danish | | Date Started: June-3-2012 | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +5.15 | | Driller: Misbah | | Date Completed: June-7-2012 | | | | | | | | | | | | |
| 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 | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | | From | To |
| 20.00 | | | | Brownish Grey, moderately fractured, good, slightly horizontally jointed, medium hard, MUDSTONE. with lenses of Gypsum at place | | | | | | | | | | | | | | | | | | |
| 21.00 | CRS-21 | 2.0 | | | | | | | | | | | | | 20.00 | 21.00 | 82 | 72 | 20.48 | 20.65 | Sample Waxed 17cm | |
| 22.00 | CRS-22 | | | | | | | | | | | | | | 21.00 | 22.00 | 85 | 48 | 21.30 | 21.42 | Sample Waxed 12cm | |
| 23.00 | CRS-23 | 3.0 | | Grey, slightly fractured, good to excellent, slightly horizontally jointed, hard, SILTSTONE. | | | | | | | | | | | 22.00 | 23.00 | 80 | 75 | - | - | | |
| 24.00 | CRS-24 | | | | | | | | | | | | | | 23.00 | 24.00 | 80 | 78 | - | - | | |
| 25.00 | CRS-25 | | | | | | | | | | | | | | 24.00 | 25.00 | 90 | 67 | 24.15 | 24.30 | Sample Waxed 15cm | |
| 26.00 | CRS-26 | 5.0 | | Grey, moderately fractured, fair to good, moderately horizontally jointed, medium hard, SILTSTONE. | | | | | | | | | | | 25.00 | 26.00 | 75 | 45 | 25.50 | 25.64 | Sample Waxed 14cm | |
| 27.00 | CRS-27 | | | | | | | | | | | | | | 26.00 | 27.00 | 82 | 70 | - | - | | |
| 28.00 | CRS-28 | | | | | | | | | | | | | | 27.00 | 28.00 | 80 | 60 | 27.40 | 27.55 | Sample Waxed 15cm | |
| 29.00 | CRS-29 | | | | | | | | | | | | | | 28.00 | 29.00 | 82 | 45 | - | - | | |
| 30.00 | CRS-30 | | | | | | | | | | | | | 29.00 | 30.00 | 90 | 80 | 29.00 | 29.15 | Sample Waxed 15cm | | |
| END OF BOREHOLE AT 30.0m Depth | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-154

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

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2749008 | | Ground Water: 4.0m | | Borehole No: KCR/BH#67 | | | | | | | | | | | |
|--|----------------|---------------------------|--------------------|---|--|-------------------------|---------|-----------------------|--------------|-----------------------------|----|------------------------|----|----|---------|-----------|--------------------|-----------|----------------------------|------|-------------------|----|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R301889 | | Geologist: Aurangzaib | | Date Started: May-25-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.17 | | Driller: M.Murad | | Date Completed: May-30-2012 | | | | | | | | | | | | | |
| 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 | | | [Lithology Symbol] | Brown, medium dense, fine to medium, Sandy CLAY, trace to little Gravels | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | | [Lithology Symbol] | Brown, medium dense, fine to medium, Sandy CLAY, trace to little Gravels | 5 | 6 | 7 | 7 | 20 | | | | | | 0.00 | 1.00 | 80 | NA | - | - | | | |
| 2.00 | CRS-2 SPT-2 | 4.0 | [Lithology Symbol] | | 6 | 8 | 8 | 8 | 24 | | | | | | 1.00 | 2.00 | 90 | NA | - | - | | | |
| 3.00 | CRS-3 SPT-3 | | [Lithology Symbol] | | 9 | 8 | 9 | 12 | 29 | | | | | | 2.00 | 3.00 | 80 | NA | 2.74 | 2.96 | Sample Waxed 22cm | | |
| 4.00 | CRS-4 SPT-4 | | [Lithology Symbol] | | 20/No Penetration | | | | | R | | | | | 3.00 | 4.00 | 70 | NA | - | - | | | |
| 5.00 | CRS-5 | | [Lithology Symbol] | Brown, very dense, medium to coarse, Gravely Silty SAND, with little Clay. | | | | | | | | | | | 4.00 | 5.00 | 65 | NA | - | - | | | |
| 6.00 | CRS-6 | 3.6 | [Lithology Symbol] | | | | | | | | | | | | 5.00 | 6.00 | 60 | NA | - | - | | | |
| 7.00 | CRS-7 | | [Lithology Symbol] | | | | | | | | | | | | 6.00 | 7.00 | 50 | NA | - | - | | | |
| 8.00 | CRS-8 | | [Lithology Symbol] | | | | | | | | | | | | 7.00 | 8.00 | 65 | Nil | - | - | | | |
| 9.00 | CRS-9 | 2.2 | [Lithology Symbol] | Brown, highly fractured, very poor, highly weathered, medium hard, SANDSTONE, with lenses of SHALE. | | | | | | | | | | | 8.00 | 9.00 | 60 | Nil | - | - | | | |
| 10.00 | CRS-10 | 0.2 | [Lithology Symbol] | | Brown, highly fractured, very poor, CONGLOMERATE | | | | | | | | | | 9.00 | 10.00 | 85 | 20 | 9.86 | 9.96 | Sample Waxed 10cm | | |

APP-2-2-155

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 3 of 3

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2749008 | | Ground Water: 4.0m | | Borehole No: KCR/BH#67 | | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|-----------------------|--------------|---------------------------|----|-----------------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|--|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R301889 | | Geologist: Aurangzaib | | Date Started: May-25-2012 | | Date Completed: May-30-2012 | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.17 | | Driller: M.Murad | | | | | | | | | | | | | | | | |
| 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 | | | |
| 20.00 | | 2.0 | | Grey, slightly to moderately fractured, fair to poor, slightly weathered, hard, SANDSTONE | | | | | | | | | | | | | | | | | | | | |
| 21.00 | CRS-21 | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 22cm | |
| 22.00 | CRS-22 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 18cm |
| 23.00 | CRS-23 | 3.0 | | Grey, highly fractured, very poor, horizontal jointed, highly Weathered, medium hard, SANDSTONE, with lenses of Shale at places | | | | | | | | | | | | | | | | | | | | |
| 24.00 | CRS-24 | | | | | | | | | | | | | | | | | | | | | | | |
| 25.00 | CRS-25 | | | | | | | | | | | | | | | | | | | | | | | |
| 26.00 | CRS-26 | 3.9 | | Grey, highly fractured, very poor, horizontally jointed, highly Weathered, medium hard, SANDSTONE, with lenses of Siltstone at places | | | | | | | | | | | | | | | | | | | | |
| 27.00 | CRS-27 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 24cm |
| 28.00 | CRS-28 | | | | | | | | | | | | | | | | | | | | | | | |
| 29.00 | CRS-29 | 1.1 | | Brownish grey/ Greyish yellow, highly fractured, very poor, highly weathered, hard, LIMESTONE. | | | | | | | | | | | | | | | | | | | | |
| 30.00 | CRS-30 | | | | | | | | | | | | | | | | | | | | | | | |
| END OF BOREHOLE AT 30.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | |

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

APP-2-2-157

SUBSURFACE EXPLORATION LOG FIELD DATA

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2749212 | | Ground Water: 1.70m | | Borehole No: KCR/BH#68 | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|-----------------------|--------------|------------------------------|----------|----|----|----|---------|-----------|--------------------|-----------|----------------------------|----|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R302270 | | Geologist: Aurangzaib | | Date Started: May-31-2012 | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +9.84 | | Driller: Jamali | | Date Completed: June-03-2012 | | | | | | | | | | | |
| 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 |
| 0.00 | | | [Symbol] | Brownish black to greyish brown, medium dense, medium to Coarse, Silty SAND, little to some Gravels & Boulders | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 3.0 | [Symbol] | | 6 | 4 | 6 | 6 | 16 | | | | | | 0.00 | 1.00 | 70 | NA | - | - | |
| 2.00 | CRS-2 | | [Symbol] | | 4 | 5 | 7 | 7 | 19 | | | | | | 1.00 | 2.00 | 70 | NA | - | - | |
| 3.00 | CRS-3 | | [Symbol] | | 10 | 8 | 9 | 9 | 26 | | | | | | 2.00 | 3.00 | 65 | NA | - | - | |
| 4.00 | CRS-4 | 1.0 | [Symbol] | Brownish Grey, very stiff, Silty CLAY, little Sand | 7 | 8 | 10 | 9 | 27 | | | | | | | | | | | | Sample Waxed 23cm |
| 5.00 | CRS-5 | 2.0 | [Symbol] | | 4.00 | 5.00 | 90 | NA | 4.33 | 4.6 | | | | | | | | | | | Sample Waxed 27cm |
| 6.00 | CRS-6 | | [Symbol] | Brown, slightly fractured to moderately fractured, excellent to fair, highly weathered, hard, MUDSTONE, interbedded with SILTSTONE. | | | | | | | | | | | | | | | | | |
| 7.00 | CRS-7 | 1.0 | [Symbol] | | 5.00 | 6.00 | 65 | NA | - | - | | | | | | | | | | | |
| 8.00 | CRS-8 | 2.3 | [Symbol] | | 5.00 | 6.00 | 85 | 47 | 6.65 | 6.95 | | | | | | | | | | | |
| 9.00 | CRS-9 | | [Symbol] | Brown, moderately fractured, poor, moderately weathered, hard, SANDSTONE | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | 0.7 | [Symbol] | | 7.00 | 8.00 | 90 | 88 | - | - | | | | | | | | | | | |
| | | | [Symbol] | | 8.00 | 9.00 | 85 | 36 | 8.8 | 8.96 | | | | | | | | | | | Sample Waxed 16cm |
| | | | [Symbol] | | 9.00 | 10.00 | 75 | 40 | 9.55 | 9.79 | | | | | | | | | | | Sample Waxed 24cm |

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

APP-2-2-158

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 3

| Client: The JICA Study Team | | | | Type of Boring: Rotary | Co-ordinate: | | N: 2749212 | Ground Water: 1.70m | Borehole No: KCR/BH#68 | | | | | | | | | | | | | | |
|--|------------|-------------------------|-----------|---|-------------------------|---------|-----------------------|------------------------------|------------------------|---------------|----|----|----|----|-----------|-------|---------------------------------|-----------|---------|----------------------------|-------|-------------------|--------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | E: 42R302270 | | Geologist: Aurangzaib | Date Started: May-31-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | Ground Elevation: +9.84 | | Driller: Jamali | Date Completed: June-03-2012 | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thickkness 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 | | 0.3 | [Pattern] | Brown, highly fractured, very poor, slightly weathered, hard, SANDSTONE. | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 1.7 | [Pattern] | Brown, highly fractured, very poor, highly weathred, medium hard, Sandy SHALE | | | | | | | | | | | | 10.00 | 11.00 | 80 | 17 | 10.11 | 10.28 | Sample Waxed 17cm | |
| 12.00 | CRS-12 | | [Pattern] | | | | | | | | | | | | | | 11.00 | 12.00 | 80 | 11 | - | - | |
| 13.00 | CRS-13 | 1.0 | [Pattern] | Brown, moderately fractured, poor, slightly weathered, medium hard, SILTSTONE, interbeded with SHALE. | | | | | | | | | | | | 12.00 | 13.00 | 80 | 35 | - | - | | |
| 14.00 | CRS-14 | 7.0 | [Pattern] | Brown, slightly to moderatly fractured, excellent to fair, horizantely jointed, moderately weathered, hard, MUDSTONE, interbeded with SHALE at places | | | | | | | | | | | | 13.00 | 14.00 | 90 | 85 | 13.66 | 13.94 | Sample Waxed 28cm | |
| 15.00 | CRS-15 | | [Pattern] | | | | | | | | | | | | | | 14.00 | 15.00 | 95 | 92 | 14.13 | 14.25 | Samplel Waxed 22cm |
| 16.00 | CRS-16 | | [Pattern] | | | | | | | | | | | | | | 15.00 | 16.00 | 90 | 66 | 15.25 | 15.43 | Sample Waxed 15cm |
| 17.00 | CRS-17 | | [Pattern] | | | | | | | | | | | | | | 16.00 | 17.00 | 89 | 76 | 16.60 | 16.78 | Sample Waxed 18cm |
| 18.00 | CRS-18 | | [Pattern] | | | | | | | | | | | | | | 17.00 | 18.00 | 90 | 86 | 17.64 | 17.74 | Sample Waxed 10cm |
| 19.00 | CRS-19 | | [Pattern] | | | | | | | | | | | | | | 18.00 | 19.00 | 86 | 75 | 18.00 | 18.12 | Sample Waxed 12cm |
| 20.00 | CRS-20 | | [Pattern] | | | | | | | | | | | | | | 19.00 | 20.00 | 99 | 98 | 19.76 | 19.99 | Sample Waxed 23cm |

APP-2-2-159

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

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2749212 | | Ground Water: 1.70m | | Borehole No: KCR/BH#68 | | | | | | | | | | | | |
|--|-----------|------------------------|-----------|--|---------------------------------------|-------------------------|---------|-----------------------|-------|------------------------------|-------|------------------------|--|--|-------------------|-------|-------|-------------------|---------------|-----------|------|-------------------|-------------------|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R302270 | | Geologist: Aurangzaib | | Date Started: May-31-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +9.84 | | Driller: Jamali | | Date Completed: June-03-2012 | | | | | | | | | | | | | | |
| 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 | | | | | Depth | | Core Recovery (%) | Core Waxed | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 20.00 | | | | Grey, slightly fractured, good to excellent, horizontally jointed, hard, MUDSTONE, interbedded with CLAYSTONE at places, | | | | | | | | | | | | | From | To | Core Recovery | R.Q.D (%) | From | To | Sample Waxed 32cm | |
| 21.00 | CRS-21 | 3.6 | | | 20.00 | 21.00 | 90 | 84 | 20.00 | 20.32 | | | | | | | | | | | | | | |
| 22.00 | CRS-22 | | | | 21.00 | 22.00 | 95 | 93 | 21.00 | 21.29 | | | | | | | | | | | | | | |
| 23.00 | CRS-23 | | | 22.00 | 23.00 | 90 | 68 | | | | | | | | | | | | | | | | | |
| 24.00 | CRS-24 | 3.0 | | Light grey, fractured, hard, Sandy LIMESTONE | | | | | | | | | | | | 23.00 | 24.00 | 70 | 58 | | | | | |
| 25.00 | CRS-25 | | | Grey, moderately fractured, poor, slightly weathered, horizontally jointed, hard, LIMESTONE | 24.00 | 25.00 | 65 | 37 | | | | | | | | | | | | | | | | |
| 26.00 | CRS-26 | | | Grey, moderately fractured, poor, hard, SHALE, with lenses of LIMESTONE | 25.00 | 26.00 | 70 | 42 | 25.24 | 25.42 | | | | | Sample Waxed 18cm | | | | | | | | | |
| 27.00 | CRS-27 | 1.0 | | Grey, moderately fractured, poor, hard, SHALE, with lenses of LIMESTONE | | | | | | | | | | | 26.00 | 27.00 | 60 | 28 | 26.00 | 26.26 | | Sample Waxed 26cm | | |
| 28.00 | CRS-28 | 1.0 | | Grey, highly fractured, poor, slightly weathered, very hard, LIMESTONE, trace fossils. | | | | | | | | | | | 27.00 | 28.00 | 70 | 31 | 27.65 | 27.75 | | Sample Waxed 10cm | | |
| 29.00 | CRS-29 | 1.4 | | Grey, highly fractured, very poor, weak to medium hard, SANDSTONE, interlayered with SHALE & LIMESTONE | | | | | | | | | | | 28.00 | 29.00 | 60 | 10 | 28.33 | 28.43 | | Sample Waxed 10cm | | |
| 30.00 | CRS-30 | | | | END OF BOREHOLE AT 30.0m Depth | | | | | | | | | | 29.00 | 30.00 | 60 | 10 | 29.37 | 29.47 | | Sample Waxed 10cm | | |

APP-2-2-160

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: 2749502 | | Ground Water: 4.10m | | Borehole No: KCR/BH#69 | | | | | | | | | | | | | | | | | |
|--|------------|---------------------------|--|---|--|--------------------------|---------|-----------------------|--------------|-----------------------------|----------|------------------------|----|----|---------|-----------|--------------------|-----------|----------------------------|----|------|----|--|--|--|--|--|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R302774 | | Geologist: Aurangzaib | | Date Started: May-20-2012 | | | | | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +14.82 | | Driller: M. Murad | | Date Completed: May-23-2012 | | | | | | | | | | | | | | | | | | | |
| 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 | | | ■■■■ ■■■■ ■■■■ ■■■■ | Yellow/ Yellowish brown, very dense, Silty SAND, trace Clay, some Gravels (as filled material) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 3.4 | ■■■■ ■■■■ ■■■■ | | 15/ No Penetration | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 | CRS-2 | | ■■■■ ■■■■ | | 25/7cm | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | CRS-3 | | ■■■■ ■■■■ | 50/10cm | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.00 | CRS-4 | 1.1 | ■■■■ ■■■■ ■■■■ ■■■■ ■■■■ | Yellow, highly fractured, very poor, highly weathered, very hard, Sandy LIMESTONE | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.00 | CRS-5 | 0.5 | ■■■■ ■■■■ | | Brown, fractured, poor, highly weathered, medium hard, Sandy SHALE | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.00 | CRS-6 | 3.1 | ■■■■ ■■■■ ■■■■ ■■■■ ■■■■ ■■■■ ■■■■ ■■■■ | Brown, highly fractured to moderately fractured, poor, highly weathered (Oxidized), horizontally & vertically jointed, hard, MUDSTONE, with lenses of SILTSTONE & SHALE | 40/15cm | | | | | | | | | | | | | | | | | | | | | | | | |
| 7.00 | CRS-7 | | ■■■■ ■■■■ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.00 | CRS-8 | | ■■■■ ■■■■ | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9.00 | CRS-9 | 1.0 | ■■■■ ■■■■ ■■■■ | Whitish yellow, fractured, poor, highly weathered, very hard, LIMESTONE | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | 0.9 | ■■■■ ■■■■ ■■■■ | Brown, highly fractured, very poor, moderately weathered, horizontally jointed, medium hard, SILTSTONE | | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-161

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: 2749502 | Ground Water: 4.10m | | Borehole No: KCR/BH#69 | | | | | | | | | |
|--|------------|------------------------|-----------|--|---|---------|--------------------------|---------|-----------------------|---------------------|-----------------------------|------------------------|----|-------|-----------|-------|--------------------|-----------|---------|----------------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | | E: 42R302774 | | Geologist: Aurangzaib | | Date Started: May-20-2012 | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | | Ground Elevation: +14.82 | | Driller: M.Murad | | Date Completed: May-23-2012 | | | | | | | | | | |
| 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 | | | | Brown, moderately fractured, fair, highly weathered, (Oxidized), horizontally jointed, hard, MUDSTONE, interlayered with SHALE | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 2.0 | | | | | | | | | | | | | 10.00 | 11.00 | 88 | 58 | 10.24 | 10.36 | Sample Waxed 12cm |
| 12.00 | CRS-12 | | | Brown, moderately fractured, fair, highly weathered (Oxidized), horizontally jointed, hard, SHALE, interlayer with SILTSTONE | | | | | | | | | | | | | | | | | |
| 13.00 | CRS-13 | 1.8 | | | | | | | | | | | | | 11.00 | 12.00 | 92 | 60 | 11.50 | 11.70 | Sample Waxed 20cm |
| 14.00 | CRS-14 | | | | Grey, fractured to highly fractured, poor, highly weathered, horizontally jointed hard, LIMESTONE | | | | | | | | | | | | | | | | |
| 15.00 | CRS-15 | 3.1 | | | | | | | | | | | | | 12.00 | 13.00 | 90 | 51 | 12.52 | 12.66 | Sample Waxed 16cm |
| 16.00 | CRS-16 | | | | | | | | | | | | | | | 13.00 | 14.00 | 75 | 32 | 13.00 | 13.11 |
| 17.00 | CRS-17 | | | Brown, highly fractured, poor, highly weathered, friable SANDSTONE, (lense of Sandy SHALE at top) | | | | | | | | | | | | | | | | | |
| 18.00 | CRS-18 | 2.6 | | | | | | | | | | | | | 14.00 | 15.00 | 80 | 42 | 14.36 | 14.57 | Sample Waxed 21cm |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | 15.00 | 16.00 | 70 | Nil | - | - |
| 20.00 | CRS-20 | 0.5 | | | | | | | | | | | | | 16.00 | 17.00 | 60 | 11 | 16.45 | 16.56 | Sample Waxed 11cm |
| | | | | | | | | | | | | | | 17.00 | 18.00 | 40 | Nil | - | - | | |
| | | | | | | | | | | | | | | 18.00 | 19.00 | 30 | Nil | - | - | | |
| | | | | | | | | | | | | | | 19.00 | 20.00 | 60 | 20 | - | - | | |
| | | | | END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | |

APP-2-2-162

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: 2749614 | | Ground Water: 2.90m | | Borehole No: KCR/BH#70 | | | | | | | | | | | | | | | |
|--|----------------|-------------------------|-----------|--|---------|---------|--------------------------|---------|------------------------|---------------|-----------------------------|----------|----|----|-----------|---------|---------------------|-----------|----------------------------|------|------|--|--|--|------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | | E: 42R303109 | | Geologist: Irfan Hanif | | Date Started: May-20-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | | Ground Elevation: +12.77 | | Driller: Misba | | Date Completed: May-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 (C,m) | R.Q.D (%) | Core Waxed for Testing (m) | | | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | | | | To | From | to | | | | | |
| 0.00 | | | | Greyish Brown, loose to medium dense, Gravely Silty SAND, trace Clay (as filled material) | | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | 2.0 | | | 1 | 2 | 3 | 5 | 10 | | | | | | | 0.00 | 1.00 | 95 | NA | - | - | | | | | Dry Coring |
| 2.00 | CRS-2 SPT-2 | | | Greyish brown, highly fractured, very poor, highly oxidized, friable SANDSTONE, | 28/14 | | | | | | | | | | 1.00 | 2.00 | 100 | NA | - | - | | | | | Dry Coring | |
| 3.00 | CRS-3 SPT-3 | | | | 50/14 | | | | | | | | | | | 2.00 | 3.00 | 75 | 11 | 2.15 | 2.26 | | | | | Sample Waxed 11cm |
| 4.00 | CRS-4 SPT-4 | 4.0 | | | 30/13 | | | | | | | | | | | 3.00 | 4.00 | 70 | Nil | - | - | | | | | |
| 5.00 | CRS-5 | | | | | | | | | | | | | | | 4.00 | 5.00 | 70 | Nil | - | - | | | | | |
| 6.00 | CRS-6 | | | | | | | | | | | | | | | 5.00 | 6.00 | 70 | Nil | - | - | | | | | |
| 7.00 | CRS-7 | | | Reddish brown, highly fractured, very poor, highly weathered, highly oxidized, friable SANDSTONE | | | | | | | | | | | 6.00 | 7.00 | 70 | Nil | - | - | | | | | | |
| 8.00 | CRS-8 | 4.0 | | | | | | | | | | | | | | 7.00 | 8.00 | 70 | 14 | - | - | | | | | |
| 9.00 | CRS-9 | | | | | | | | | | | | | | | 8.00 | 9.00 | 70 | Nil | - | - | | | | | |
| 10.00 | CRS-10 | | | | | | | | | | | | | | | 9.00 | 10.00 | 80 | Nil | - | - | | | | | |

APP-2-2-163

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

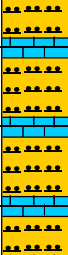
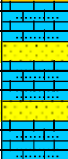
| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2749614 | | Ground Water: 2.90m | | Borehole No: KCR/BH#70 | | | | | | | | | | | | |
|--|------------|--------------------------|-----------|--|---------|--------------------------|---------|------------------------|--------------|-----------------------------|----|----|----|---------|-----------|---------------------|-----------|----------------------------|-------|-------------------|-------------------|----|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R303109 | | Geologist: Irfan Hanif | | Date Started: May-20-2012 | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +12.77 | | Driller: Misba | | Date Completed: May-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 (C.m) | R.Q.D (%) | Core Waxed for Testing (m) | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | | | | | 50 | From | To | From | to |
| 10.00 | SPT-10 | 0.3 | [Pattern] | Yellowish brown, highly fractured, very poor, highly weathered, friable SANDSTONE | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 0.7 | [Pattern] | Brown, highly fractured, very poor, highly weathered, hard to very hard, Sandy LIMESTONE, trace fossils | | | | | | | | | | 10.00 | 11.00 | 70 | Nil | - | - | | | |
| 12.00 | CRS-12 | 2.9 | [Pattern] | Brown, highly fractured, very poor, slightly weathered, horizontally jointed, medium hard to hard, limonitic, SANDSTONE, interlayered of CLAYSTONE at places | | | | | | | | | | 11.00 | 12.00 | 65 | Nil | - | - | | | |
| 13.00 | CRS-13 | | [Pattern] | | | | | | | | | | | | 12.00 | 13.00 | 70 | 10 | 13.03 | 13.13 | Sample Waxed 10cm | |
| 14.00 | CRS-14 | | [Pattern] | | | | | | | | | | | | | 13.00 | 14.00 | 70 | 10 | - | - | |
| 15.00 | CRS-15 | 1.1 | [Pattern] | Grey, moderately fractured, fair, horizontally Jointed, very hard, SILTSTONE | | | | | | | | | | 14.00 | 15.00 | 80 | 45 | 14.05 | 14.33 | Sample Waxed 28cm | | |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | |

APP-2-2-164

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: 2749927 | | Ground Water: 4.50m | | Borehole No: KCR/BH#71 | | | | | | | | | | | | |
|--|------------|--------------------------|---|--|---------|--------------------------|---------|---------------------|--------------|-----------------------------|----|----|----|----|-----------|-------|---------------------|-----------|---------|----------------------------|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R303660 | | Geologist: M. Irfan | | Date Started: May-23-2012 | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +12.39 | | Driller: Misba | | Date Completed: May-24-2012 | | | | | | | | | | | | |
| 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 | | |  | Grey, slightly fractured, good, horizontally jointed, very hard to hard, SILTSTONE, interlayered with LIMESTONE | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 3.0 | | | | | | | | | | | | | 10.00 | 11.00 | 80 | 69 | 10.08 | 10.21 | Sample Waxed 13cm | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | 11.00 | 12.00 | 85 | 82 | 11.45 | 11.57 | Sample Waxed 12cm |
| 13.00 | CRS-13 | |  | Grey, moderately fractured, fair to poor, horizontally jointed, hard to medium hard, Sandy LIMESTONE, trace fossils, interlayered with SANDSTONE | | | | | | | | | | | | | | | | | | |
| 14.00 | CRS-14 | 2.0 | | | | | | | | | | | | | | 13.00 | 14.00 | 79 | 53 | 13.25 | 13.35 | Sample Waxed 10cm |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | 14.00 | 15.00 | 70 | 37 | 14.33 | 14.43 | Sample Waxed 10cm |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | |

APP-2-2-166

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: 2750220 | | Ground Water: 2.25m | | Borehole No: KCR/BH#72 | | | | | | | | | | | | | |
|--|------------|---------------------------|-----------|--|---------|-------------------------|---------|-----------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|---------|--------------------|-----------|----------------------------|------|------|-------------------|--|-------------------|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R304174 | | Geologist: Aurangzaib | | Date Started: May-16-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.42 | | Driller: M. Murad | | Date Completed: May-18-2012 | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick. kness of Layer (m) | Lithology | Stratum Description | 65 | | | | | 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 | | | | Blackish grey, very loose to loose, Silty SAND, some Gravels & pieces plastic bags and organic material (solid waste) | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 3.0 | | | 5 | 1 | 1 | 2 | 4 | | | | | | | 0.00 | 1.00 | 85 | Nil | - | - | | | | |
| | SPT-1 | | | | 7 | 4 | 4 | 2 | 10 | | | | | | | 1.00 | 2.00 | 70 | Nil | - | - | | | | |
| 2.00 | CRS-2 | | | | 9 | 7 | 7 | 7 | 21 | | | | | | | 2.00 | 3.00 | 73 | Nil | - | - | | | | |
| | SPT-2 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | CRS-3 | 1.0 | | Brown, medium dense, Silty SAND, some Gravels | 10 | 10 | 14 | 18 | 42 | | | | | | 3.00 | 4.00 | 65 | Nil | - | - | | | | | |
| | SPT-3 | | | | 25 | 10/5" | R | | | | | | | | | 4.00 | 5.00 | 75 | Nil | - | - | | | | |
| 4.00 | CRS-4 | 1.2 | | Brown, hard to very hard, Silty CLAY, little Sand and some Gravels. | | | | | | | | | | | | | | | | | | | | | |
| | SPT-4 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.00 | CRS-5 | 1.8 | | Grey, moderately fractured to slightly fractured, fair to good, moderately weathered, medium hard, Sandy SILTSTONE, with lenses of SHALE | | | | | | | | | | | | | | | | | | | | | |
| | SPT-5 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.00 | CRS-6 | | | | | | | | | | | | | | | | 5.00 | 6.00 | 75 | 44 | 5.48 | 5.61 | | Sample Waxed 13cm | |
| 7.00 | CRS-7 | | | | | | | | | | | | | | 6.00 | 7.00 | 85 | 68 | 6.35 | 6.65 | | Sample Waxed 30cm | | | |
| 8.00 | CRS-8 | 1.3 | | Grey, slightly fractured, fair to good, slightly weathered, horizontally jointed, hard, MUDSTONE, with lenses of SILTSTONE | | | | | | | | | | | | | | | | | | | | | |
| | SPT-6 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9.00 | CRS-9 | 1.2 | | Grey, slightly fractured, fair, highly weathered, very hard, fossiliferous, Sandy LIMESTONE. | | | | | | | | | | | | | | | | | | | | | |
| | SPT-7 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | 0.5 | | Grey, moderately fractured, fair, highly weathered, medium hard, Sandy SHALE. | | | | | | | | | | | | | | | | | | | | | |
| | SPT-8 | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-167

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: 2750220 | | Ground Water: 2.25m | | Borehole No: KCR/BH#72 | | | | | | | | | | | | | |
|--|------------|----------------------------|-----------|---|---------|-------------------------|---------|-----------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|-------|-------|-------------------|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R304174 | | Geologist: Aurangzaib | | Date Started: May-16-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.42 | | Driller: M. Murad | | Date Completed: May-18-2012 | | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thick lensess 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 | | | 5.0 | Grey, highly fractured, poor, moderately weathered, medium hard, SHALE, with lenses of SILTSTONE. | | | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | | | | | | | | | | | | | | | | 10.00 | 11.00 | 75 | 45 | 10.55 | 10.68 | Sample Waxed 13cm | | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | 11.00 | 12.00 | 75 | 46 | 11.00 | 11.12 | Sample Waxed 12cm | | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | 12.00 | 13.00 | 70 | 10 | - | - | | | |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | 13.00 | 14.00 | 85 | 45 | 18.30 | 18.40 | Sample Waxed 10cm | | |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | 14.00 | 15.00 | 90 | 22 | 19.53 | 19.61 | Sample Waxed 11cm | | |
| | | | | END OF BOREHOLE AT 15.0m Depth | | | | | | | | | | | | | | | | | | | | | |

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

APP-2-2-168

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 2 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2750469 | | Ground Water: 2.0m | | Borehole No: KCR/BH#73 | | | | | | | | | | | | |
|--|------------|------------|-----------|---|---------|-------------------------|---------|------------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|-------|--------------------|-----------|---------|----------------------------|-------|-------------------|-------------------|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R304569 | | Geologist: Irfan Hanif | | Date Started: May-15-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +8.27 | | Driller: Misbauddin | | Date Completed: May-18-2012 | | | | | | | | | | | | | | |
| 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 | | | | Dark grey, moderately fractured, fair, horizontally jointed, medium hard to very hard, SHALE, with lenses of MUDSTONE at places | | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 2.4 | | | | | | | | | | | | | | | 10.00 | 11.00 | 80 | 63 | 10.58 | 10.70 | Sample Waxed 12cm | |
| 12.00 | CRS-12 | | | Grey, highly fractured, very poor, horizontally jointed, medium hard, Sandy SHALE, interbedded with friable SANDSTONE | | | | | | | | | | | | | | | | | | | | |
| 13.00 | CRS-13 | 2.6 | | | | | | | | | | | | | | | 11.00 | 12.00 | 86 | 33 | 11.40 | 11.53 | Sample Waxed 13cm | |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | 12.00 | 13.00 | 75 | 18 | - | - | | |
| 15.00 | CRS-15 | | | Grey, highly fractured, very poor to poor, horizontally jointed, medium hard, Sandy SHALE, with lenses of SANDSTONE | | | | | | | | | | | | | | | | | | | | |
| 16.00 | CRS-16 | 3.0 | | | | | | | | | | | | | | | 13.00 | 14.00 | 70 | 23 | 13.50 | 13.63 | Sample Waxed 13cm | |
| 17.00 | CRS-17 | | | | | | | | | | | | | | | | 14.00 | 15.00 | 65 | Nil | - | - | | |
| 18.00 | CRS-18 | | | | | | | | | | | | | | | | 15.00 | 16.00 | 70 | 36 | 15.17 | 15.27 | Sample Waxed 10cm | |
| 19.00 | CRS-19 | 2.0 | | Grey, highly fractured, very poor, medium hard, SHALE, interbedded with SILTSTONE | | | | | | | | | | | | | | | | | | | | |
| 20.00 | CRS-20 | | | | | | | | | | | | | | | | 16.00 | 17.00 | 65 | Nil | - | - | | |
| | | | | END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | 17.00 | 18.00 | 70 | 30 | 17.34 | 17.44 | Sample Waxed 10cm | | |
| | | | | | | | | | | | | | | | | 18.00 | 19.00 | 75 | 21 | 18.15 | 18.26 | Sample Waxed 11cm | | |
| | | | | | | | | | | | | | | | | 19.00 | 20.00 | 70 | Nil | - | - | | | |

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

APP-2-2-170

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| | | | | | | | | | | | |
|--|--|--|--|---------------------------|--|-------------------------|--|-----------------------|--|-----------------------------|--|
| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: N: 2750564 | | Ground Water: 0.85m | | Borehole No: KCR/BH#74 | |
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R304652 | | Geologist: Aurangzaib | | Date Started: May-12-2012 | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.45 | | Driller: M. Murad | | Date Completed: May-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 |
| 0.00 | | | | Dark grey, loose, fine to medium, Silty SAND, little Gravels, little Clay, some organic material & plastic bags (Solid Waste) | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 SPT-1 | 2.0 | | | 3 | 2 | 2 | 2 | 6 | o | 0.00 | 1.00 | 90 | NA | - | - | Dry Coring | | | |
| 2.00 | CRS-2 SPT-2 | 1.0 | | | 3 | 2 | 3 | 4 | 9 | o | 1.00 | 2.00 | 88 | NA | - | - | Dry Coring | | | |
| 3.00 | CRS-3 SPT-3 | 1.0 | | | 4 | 2 | 2 | 6 | 10 | o | 2.00 | 3.00 | 80 | NA | - | - | Dry Coring | | | |
| 4.00 | CRS-4 SPT-4 | 0.5 | | Brown, loose, Silty SAND, trace Gravels | 7 | 10 | 13 | 20 | 43 | | 3.00 | 4.00 | 80 | NA | - | - | Dry Coring | | | |
| 5.00 | CRS-5 SPT-5 | 2.5 | | | 25/5cm | | | | | R | 4.00 | 5.00 | 70 | Nil | - | - | | | | |
| 6.00 | CRS-6 | | | Dark grey to Grey, highly to moderately fractured, poor, highly weathered, medium hard, SHALE | | | | | | | 5.00 | 6.00 | 65 | 18 | 5.46 | 5.63 | Sample Waxed 17cm | | | |
| 7.00 | CRS-7 | | | | | | | | | | 6.00 | 7.00 | 85 | 39 | 6.53 | 6.71 | Sample Waxed 18cm | | | |
| 8.00 | CRS-8 | 0.5 | | | Brown, moderately fractured, fair, Slightly weathered, hard, CLAYSTONE | | | | | | | 7.00 | 8.00 | 85 | 40 | 7.35 | 7.51 | Sample Waxed 16cm | | |
| 9.00 | CRS-9 | 2.0 | | Grey, highly fractured to moderately fractured, very poor to fair, highly weathered, medium hard, Sandy SHALE bands of SANDSTONE at places | | | | | | | 8.00 | 9.00 | 65 | Nil | - | - | | | | |
| 10.00 | CRS-10 | | | | | | | | | | 9.00 | 10.00 | 77 | 50 | 9.53 | 9.71 | Sample Waxed 18cm | | | |

APP-2-2-171

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: 2750564 | | Ground Water: 0.85m | | Borehole No: KCR/BH#74 | | | | | | | | | | | |
|--|-----------------|--------------------------|-----------|--|---------|-------------------------|---------|-----------------------|--------------|-----------------------------|----|----|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R304652 | | Geologist: Aurangzaib | | Date Started: May-12-2012 | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.45 | | Driller: M. Murad | | Date Completed: May-15-2012 | | | | | | | | | | | |
| 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 | | | | Grey, moderately fractured, poor to fair, moderately weathered, medium hard, Sandy SHALE | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 3.8 | | | | | | | | | | | | | | | | | | | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | | | | | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | | | | |
| 14.00 | CRS-14 SPT-6 | 1.7 | | Grey, highly fractured, very poor, moderately weathered, friable SANDSTONE, interbedded with SHALE | 50/9 | | | | | | | | | | | | | | | | |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | | | |
| 16.00 | CRS-16 | | | | | | | | | | | | | | | | | | | | |
| 17.00 | CRS-17 | 3.3 | | Grey, highly fractured, very poor, highly weathered, medium hard, Sandy SHALE | | | | | | | | | | | | | | | | | |
| 18.00 | CRS-18 | | | | | | | | | | | | | | | | | | | | |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | | | | | | |
| 20.00 | CRS-20 | 1.2 | | Grey, moderately fractured, fair, moderately to highly weathered, horizontally jointed, hard, MUDSTONE, with lenses of SILTSTONE & SHALE | | | | | | | | | | | | | | | | | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-172

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: 2750819 | | Ground Water: 2.75m | | Borehole No: KCR/BH#75 | | | | | | | | | | | |
|--|------------|------------------------|---------------------------|---|---------|-------------------------|---------|----------------------|--------------|-----------------------------|----|------------------------|----|------|-----------|---------|---------------------|-----------|----------------------------|-------------------|-------------------|--|--|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | Machine Make: Russian | | | E: 42R305189 | | Geologist: M. Irfan | | Date Started: May-5-2012 | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | Drilling Fluid: Bentonite | | | Ground Elevation: +7.14 | | Driller: Misba uddin | | Date Completed: May-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 (C.m) | R.Q.D (%) | Core Waxed for Testing (m) | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | | | | To | From | to | | |
| 0.00 | | 1.0 | | Brownish grey, fine to medium, SAND, little Concretion & Gravels | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | | | Brown, moderately fractured, good, medium hard, Sandy SHALE. | 3 | 3 | 3 | 10/0cm | R | | | | | | 0.00 | 1.00 | 100 | NA | - | - | | | |
| 2.00 | CRS-2 | 0.4 | | Brown, hard, slightly fractured, good, weathered, medium hard, fossiliferous LIMESTONE. | | | | | | | | | | | 1.00 | 2.00 | 85 | 91 | - | - | | | |
| 3.00 | CRS-3 | 0.5 | | Brown, highly fractured, very poor, highly weathered, fine grained, friable SANDSTONE. | 11 | 10 | 10 | 11 | 31 | | | | | | 2.00 | 3.00 | 80 | Nil | - | - | | | |
| 4.00 | CRS-4 | 3.6 | | (ferrogeneous b/w 4.5 to 5.0m) | 7 | 8 | 8 | 10 | 26 | | | | | | 3.00 | 4.00 | 85 | 15 | - | - | | | |
| 5.00 | CRS-5 | | | | 22 | 13/5cm | | | R | | | | | 4.00 | 5.00 | 73 | 17 | 4.34 | 4.51 | Sample Waxed 17cm | | | |
| 6.00 | CRS-6 | 1.5 | | Grey, moderately fractured, poor to fair, weathered, hard, SHALE. | | | | | | | | | | | 5.00 | 6.00 | 65 | 14 | - | - | | | |
| 7.00 | CRS-7 | | | | | | | | | | | | | | 6.00 | 7.00 | 70 | 43 | 6.38 | 6.49 | Sample Waxed 11cm | | |
| 8.00 | CRS-8 | 1.0 | | Grey, moderately fractured, fair, medium hard, SILTSTONE, interbedded with SHALE. | | | | | | | | | | | 7.00 | 8.00 | 73 | 41 | 7.40 | 7.51 | Sample Waxed 11cm | | |
| 9.00 | CRS-9 | 2.0 | | Grey, highly fractured, poor, medium hard, SHALE, interbedded with SILTSTONE. | | | | | | | | | | | 8.00 | 9.00 | 70 | 24 | 8.25 | 8.39 | Sample Waxed 14cm | | |
| 10.00 | CRS-10 | | | | | | | | | | | | | | 9.00 | 10.00 | 73 | 26 | 9.52 | 9.64 | Sample Waxed 5cm | | |

APP-2-2-173

SPT: Standard Penetration Test CRS : Core Sample CR: Core Recovery RQD: Rock Quality Designation, DS: Disturbance 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: 2750819 | | Ground Water: 2.75m | | Borehole No: KCR/BH#75 | | | | | | | | | | | | | | |
|--|------------|------------------------|-----------|---|---------|-------------------------|---------|--------------|--------------|----------------------|----|-----------------------------|----|----|-----------|----|---------------------|-----------|---------|----------------------------|-------|-------|-------|-------------------|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | | | E: 42R305189 | | Geologist: M. Irfan | | Date Started: May-5-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +7.14 | | | | Driller: Misba uddin | | Date Completed: May-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 (C.m) | R.Q.D (%) | | Core Waxed for Testing (m) | | | | | | |
| | | | | | | | | | | 10 | 20 | 30 | 40 | 50 | From | To | | | | From | to | | | | | |
| 10.00 | | | | Grey, slightly fractured, fair to excellent, horizontally jointed, medium hard, MUDSTONE, interbedded with SHALE. | | | | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | | | | | | | | | | | | | | | | | 10.00 | 11.00 | 80 | 57 | 10.00 | 10.17 | Sample Waxed 17cm | | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | | | 11.00 | 12.00 | 78 | 52 | 11.00 | 11.13 | Sample Waxed 13cm | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | | | 12.00 | 13.00 | 85 | 82 | 12.23 | 12.33 | Sample Waxed 10cm |
| 14.00 | CRS-14 | | | | | | | | | | | | | | | | | | | 13.00 | 14.00 | 75 | 33 | 13.07 | 13.17 | Sample Waxed 10cm |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | 14.00 | 15.00 | 75 | 73 | - | - | | |
| 16.00 | CRS-16 | | | Grey, moderately fractured, fair to good, medium hard, SHALE, interbedded with SILTSTONE | | | | | | | | | | | | | | | 15.00 | 16.00 | 80 | 51 | 15.07 | 15.19 | Sample Waxed 12cm | |
| 17.00 | CRS-17 | | | | | | | | | | | | | | | | | | | 16.00 | 17.00 | 78 | 74 | - | - | |
| 18.00 | CRS-18 | | | Grey, slightly fractured, good, horizontally jointed, medium hard to hard, SILTSTONE, | | | | | | | | | | | | | | | | 17.00 | 18.00 | 80 | 65 | 17.29 | 17.36 | Sample Waxed 17cm |
| 19.00 | CRS-19 | | | Grey, fractured, poor, very hard, Sandy LIMESTONE, interbedded with weak to medium hard, friable SANDSTONE | | | | | | | | | | | | | | | | 18.00 | 19.00 | 75 | 28 | 18.30 | 18.43 | Sample Waxed 13cm |
| 20.00 | CRS-20 | | | Grey, highly fractured, poor, hard, SHALE, with lenses of SANDSTONE, | | | | | | | | | | | | | | | | 19.00 | 20.00 | 76 | 24 | 19.00 | 19.13 | Sample Waxed 13cm |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | | | |







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

APP-2-2-174

SUBSURFACE EXPLORATION LOG FIELD DATA

Sheet 1 of 2

| | | | | | |
|--|---------------------------|-------------------------|--------------|---------------------|-----------------------------|
| Client: The JICA Study Team | Type of Boring: Rotary | Co-ordinate: | N: 2751056 | Ground Water: 3.50m | Borehole No: KCR/BH# 76 |
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | Machine Make: Russian | | E: 42R305607 | Geologist: M.Irfan | Date Started: May-05-2012 |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | Drilling Fluid: Bentonite | Ground Elevation: +6.53 | | Driller: Misbauddin | Date Completed: May-10-2012 |

| 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 | | | | | |
| 0.00 | | |  | Brown, very loose to loose, Silty SAND, trace to little Gravel, trace Concretion | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | 3.0 |  | | | | | | | | | | | | | 0.00 | 1.00 | 100 | NA | - | - | | | | |
| 2.00 | SPT-1 | | | | 3 | 2 | 2 | 4 | 8 | | | | | | | | | | | | | | | | |
| 2.00 | CRS-2 | | | | 2 | 2 | 1 | 1 | 4 | | | | | | | | 1.00 | 2.00 | 100 | NA | - | - | | | |
| 3.00 | SPT-2 | 2.5 |  | Brown, loose to medium dense, Sandy SILT. | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | CRS-3 | | | | 2 | 2 | 3 | 4 | 9 | | | | | | | | 2.00 | 3.00 | 89 | NA | - | - | | | |
| 4.00 | SPT-3 | | | | 1 | 2 | 1 | 3 | 6 | | | | | | | | 3.00 | 4.00 | 90 | NA | - | - | | | |
| 4.00 | CRS-4 | 0.7 |  | Brown, highly fractured, poor, coarse grained, SANDSTONE | | | | | | | | | | | | | | | | | | | | | |
| 5.00 | SPT-4 | | | | 2 | 2 | 3 | 4 | 9 | | | | | | | | 4.00 | 5.00 | 80 | NA | - | - | | | |
| 5.00 | CRS-5 | | | | 1 | 2 | 1 | 3 | 6 | | | | | | | | 5.00 | 6.00 | 75 | Nil | - | - | | | |
| 6.00 | SPT-5 | 2.3 |  | Grey, highly fractured, very poor, horizontally jointed, LIMESTONE, trace fossils. | | | | | | | | | | | | | | | | | | | | | |
| 6.00 | CRS-6 | | | | 2 | 2 | 3 | 4 | 9 | | | | | | | | 6.00 | 7.00 | 70 | Nil | - | - | | | |
| 7.00 | SPT-6 | | | | 1 | 2 | 1 | 3 | 6 | | | | | | | | 7.00 | 8.00 | 60 | Nil | - | - | | | |
| 7.00 | CRS-7 | 1.5 |  | Grey, moderately fractured, fair to good, weathered, medium hard, SHALE, with lenses of SILTSTONE. | | | | | | | | | | | | | | | | | | | | | |
| 8.00 | SPT-7 | | | | 2 | 2 | 3 | 4 | 9 | | | | | | | | 8.00 | 9.00 | 75 | 32 | - | - | | | |
| 8.00 | CRS-8 | | | | 1 | 2 | 1 | 3 | 6 | | | | | | | | 9.00 | 10.00 | 80 | 65 | 9.42 | 9.65 | Sample Waxed 23cm | | |
| 9.00 | SPT-8 | | | | | | | | | | | | | | | | | | | | | | | | |
| 9.00 | CRS-9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.00 | SPT-9 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10.00 | CRS-10 | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-175

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: 2751056 | | Ground Water: 3.50m | | Borehole No: KCR/BH# 76 | | | | | | | | | | | | | |
|--|------------|---------------------------|-----------|---|--|-------------------------|---------|---------------------|--------------|-----------------------------|----|-------------------------|----|----|-----------|----|--------------------|-----------|---------|----------------------------|----|-------|-------|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R305607 | | Geologist: M.Irfan | | Date Started: May-05-2012 | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +6.53 | | Driller: Misbauddin | | Date Completed: May-10-2012 | | | | | | | | | | | | | | | |
| 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 | | 1.2 | | Grey, moderately fractured, good, weathered, medium hard, SHALE, with lenses of SILTSTONE. | | | | | | | | | | | | | | 10.00 | 11.00 | 80 | 51 | 10.11 | 10.25 | Sample Waxed 14cm | |
| 11.00 | CRS-11 | | | | | | | | | | | | | | | | | | | | | | | | |
| 12.00 | CRS-12 | 1.8 | | Grey, moderately fractured, fair to good, medium hard to hard, MUDSTONE, lenses of SHALE at bottom. | | | | | | | | | | | | | | 11.00 | 12.00 | 95 | 89 | 11.46 | 11.75 | Sample Waxed 29cm | |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | 12.00 | 13.00 | 90 | 69 | 12.63 | 12.76 | Sample Waxed 13cm | |
| 14.00 | CRS-14 | 1.0 | | Grey, moderately fractured, poor, medium hard to hard, SHALE, with lenses of SILTSTONE. | | | | | | | | | | | | | | 13.00 | 14.00 | 80 | 26 | 13.30 | 13.40 | Sample Waxed 10cm | |
| 15.00 | CRS-15 | 5.5 | | Grey, moderately fractured to slightly, fair to good, horizontally jointed, medium hard to hard, SILTSTONE. | | | | | | | | | | | | | | 14.00 | 15.00 | 85 | 50 | 14.79 | 14.89 | Sample Waxed 10cm | |
| 16.00 | CRS-16 | | | | | | | | | | | | | | | | | | 15.00 | 16.00 | 90 | 40 | 15.00 | 15.13 | Sample Waxed 13cm |
| 17.00 | CRS-17 | | | | (interbedded with SHALE b/w 16.5 to 17m) | | | | | | | | | | | | | | 16.00 | 17.00 | 85 | 68 | 16.00 | 16.20 | Sample Waxed 18cm |
| 18.00 | CRS-18 | | | | | | | | | | | | | | | | | | 17.00 | 18.00 | 90 | 88 | - | - | |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | | | | 18.00 | 19.00 | 82 | 69 | 18.12 | 18.27 | Sample Waxed 15cm |
| 20.00 | CRS-20 | 0.5 | | Grey, moderately fractured, good, medium hard, SHALE. | | | | | | | | | | | | | | 19.00 | 20.00 | 88 | 75 | 19.64 | 19.76 | Sample Waxed 12cm | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-176

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



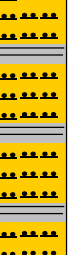
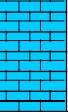
Sheet 1 of 2

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2751365 | Ground Water: 4.75m | | Borehole No: KCR/BH#77 | | | | | | | | | | | | | | | |
|--|------------|--------------------------|-----------|--|---------|-------------------------|---------|-----------------------|---------------------|-----------------------------|------------------------|----------|----|----|-----------|---------------------|---------|-----------|----------------------------|----|------|----|--|--|--|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R306182 | | Geologist: Aurangzaib | | Date Started: May-5-2012 | | | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +8.52 | | Driller: Murad Jamali | | Date Completed: May-10-2012 | | | | | | | | | | | | | | | | |
| 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 | | | | |
| 0.00 | | 1.0 | | Greyish brown, Silty SAND, some Gravels pieces (Filled Material) | | | | | | | | | | | | | | | | | | | | | | |
| 1.00 | CRS-1 | | | | | | | | | | | | | | | | | | | | | | | | | Dry Coring |
| | SPT-1 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 | CRS-2 | 1.0 | | Greyish Brown, loose, medium to coarse, Silty SAND, and trace Gravels (Filled Material) | 1 | 2 | 3 | 4 | 9 | | | | | | | | | | | | | | | | | Dry Coring |
| | SPT-2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | CRS-3 | 1.0 | | Greyish Brown, very dense, Clayey Silty SAND, little Gravels | 3 | 7 | 50/7cm | | R | | | | | | | | | | | | | | | | | Dry Coring |
| 4.00 | CRS-4 | 1.5 | | Brown, modarety fractured, fair, slightly weathered, medium hard, Sandy SHALE | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 12cm |
| 5.00 | CRS-5 | | | Brown, highly fractured to fractured, poor, modarety weathered, friable SILTSTONE | | | | | | | | | | | | | | | | | | | | | | |
| 6.00 | CRS-6 | 1.9 | | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 13cm |
| 7.00 | CRS-7 | 0.6 | | Brown, highly fractured, poor, highly weathered, horizontal jointed, friable SANDSTONE | | | | | | | | | | | | | | | | | | | | | | |
| 8.00 | CRS-8 | 1.0 | | Grey, highly fractured, poor, moderatly weathered, medium hard, SHALE | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 10cm |
| 9.00 | CRS-9 | 2.0 | | Grey, highly fractured, poor, highly weathered, horizontally & vertically jointed, medium hard, Sandy SILTSTONE, interlayered with hard SHALE. | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 20cm |
| 10.00 | CRS-10 | | | | | | | | | | | | | | | | | | | | | | | | | |

APP-2-2-177

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

| Client: The JICA Study Team | | | | Type of Boring: Rotary | | Co-ordinate: | | N: 2751365 | | Ground Water: 4.75m | | Borehole No: KCR/BH#77 | | | | | | | | | | | | |
|--|------------|-------------------------|---|---|---------|-------------------------|---------|-----------------------|--------------|-----------------------------|----|------------------------|----|----|-----------|--------------------|-----------|----------------------------|---------|----|------|-------------------|-------------------|-------------------|
| Project: Preparatory Survey(II) on Karachi Circular Railway Revival Project in Karachi | | | | Machine Make: Russian | | E: 42R306182 | | Geologist: Aurangzaib | | Date Started: May-5-2012 | | | | | | | | | | | | | | |
| Contractor: Consolidated Engineering Services (Pvt) Ltd | | | | Drilling Fluid: Bentonite | | Ground Elevation: +8.52 | | Driller: Murad Jamali | | Date Completed: May-10-2012 | | | | | | | | | | | | | | |
| Depth (m) | Sample No. | Thicknness 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 | | |  | Grey, modaretly to highly fractured, poor, slightly weathered, horizontally & vertically jointed, medium hard, SILTSTONE interbedded with hard Sandy SHALE. | | | | | | | | | | | | | | | | | | | | |
| 11.00 | CRS-11 | 3.0 | | | | | | | | | | | | | | | | | | | | | Sample Waxed 14cm | |
| 12.00 | CRS-12 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 12cm |
| 13.00 | CRS-13 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 13cm |
| 14.00 | CRS-14 | 2.0 |  | Grey, highly fractured, poor, slightly weathered, horizontally & vertically jointed, medium hard, SILTSTONE with lenses of SHALE | | | | | | | | | | | | | | | | | | | | |
| 15.00 | CRS-15 | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 13cm | |
| 16.00 | CRS-16 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 14cm |
| 17.00 | CRS-17 | 3.4 |  | Grey, slightly fractured, fair to good, modarretely weathered, horizontally jointed, medium hard, SILTSTONE, interbedded with hard SHALE | | | | | | | | | | | | | | | | | | | | |
| 18.00 | CRS-18 | | | | | | | | | | | | | | | | | | | | | | | |
| 19.00 | CRS-19 | | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 16cm |
| 20.00 | CRS-20 | 1.6 |  | Grey, moderately fractured, fair, highly weathered, very hard, fossiliferous LIMESTONE. | | | | | | | | | | | | | | | | | | Sample Waxed 29cm | | |
| END OF BOREHOLE AT 20.0m Depth | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 32cm | | |
| | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 10cm | | |
| | | | | | | | | | | | | | | | | | | | | | | Sample Waxed 28cm | | |

APP-2-2-178

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