

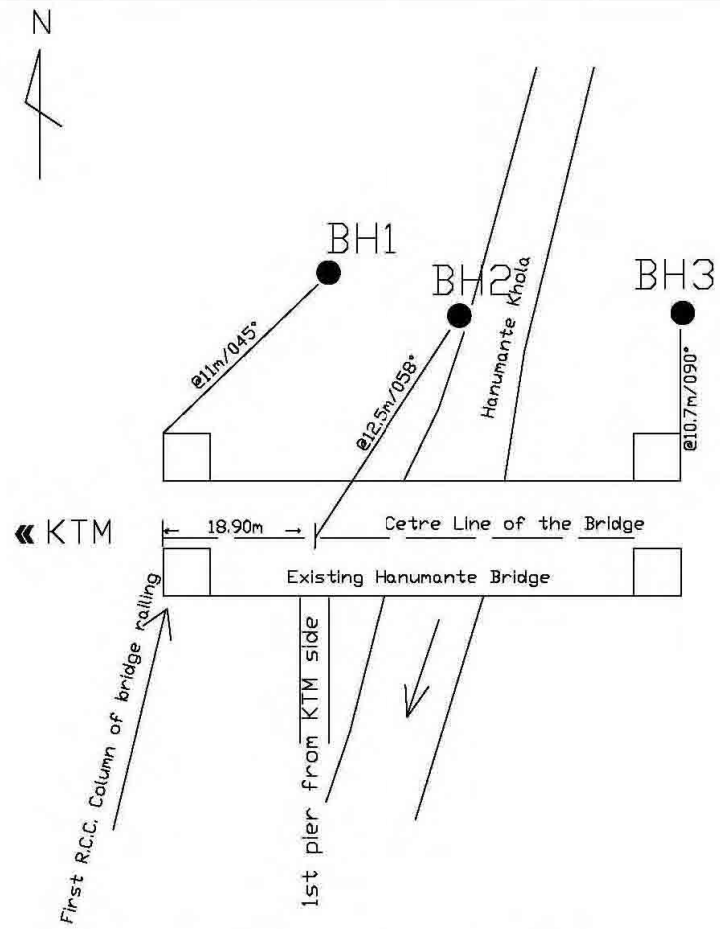
## **6. *Geotechnical Data of Manohara and Hanumante Bridges***

**6. Geotechnical Data of Manohara and Hanumante Bridges**

The locations of bored holes for the Manohara and Hanumante Bridges are shown in Figure A6-1 at Page A6-2.

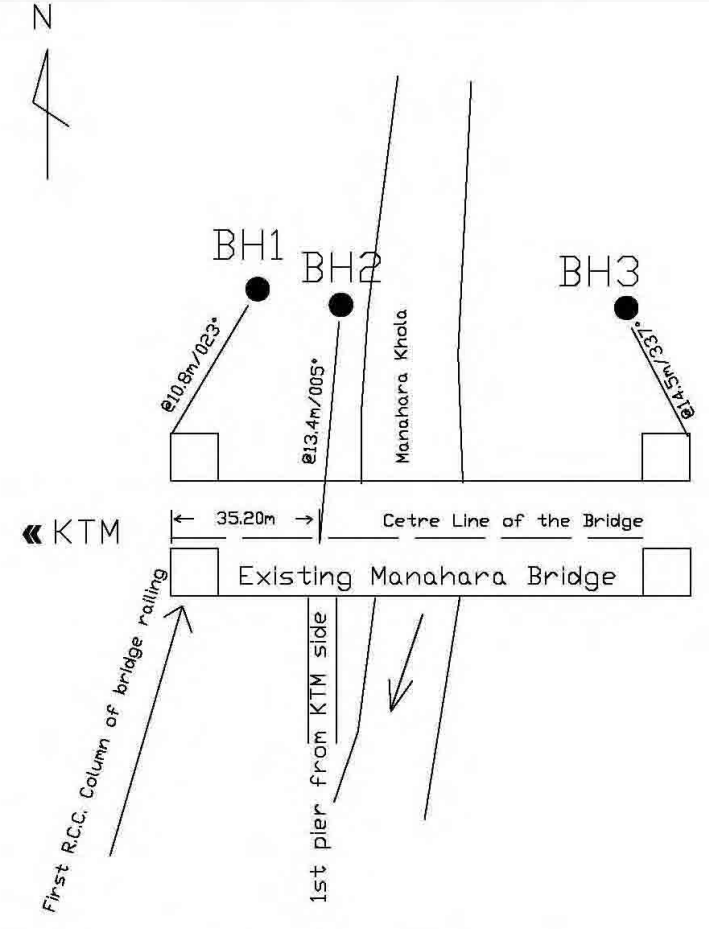
The boring logs of the respective bore holes are shown from Page A6-3 to Page A6-14.

**Basic Design on the Project for Improvement of Kathmandu-Bhaktapur Road in Nepal**



**Borehole Location at Hanumante Bridge**

**Basic Design on the Project for Improvement of Kathmandu-Bhaktapur Road in Nepal**



**Borehole Location at Manahara Bridge**

Figure 6-1 Location Maps of Bored Holes



| LOCATION: Manahara Khola  |                   |                    |                       |                 |               |              |           |         |             | BOREHOLE NO: - BH 1         |  |                            |
|---|-------------------|--------------------|-----------------------|-----------------|---------------|--------------|-----------|---------|-------------|-----------------------------|--|----------------------------|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY G/ cm3 | LIQUID LIMIT / PI (%) | CLAY / SILT (%) | SPT / CPT 'N' | RECOVERY (%) | DEPTH (m) | RUN (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:   | N:                         |
|   |                   |                    |                       |                 |               |              |           |         |             |                             | GROUND ELEVATION:  | E:                         |
|   | 107.13            |                    | 89                    | 98              | 37            | 45           | 20        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 38            | 45           | 21        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 41            | 45           | 22        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 44            | 45           | 23        |         |             |                             | Very Stiff grey to dark grey clay with plasticity behaviour      |                            |
|   |                   |                    |                       |                 | 51            | 45           | 24        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 51            | 45           | 25        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 53            | 45           | 26        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 48            | 45           | 27        |         |             |                             |  |                            |
|   | 68.47             |                    | 61                    | 98              | 54            | 45           | 28        |         |             |                             | Very Stiff grey to dark grey clay with high plasticity behaviour |                            |
|   |                   |                    |                       |                 | 56            | 45           | 29        |         |             |                             |  |                            |
|   |                   |                    |                       |                 | 58            | 45           | 30        |         |             |                             | Borehole Terminated at 30.45m.                                   |                            |
|   |                   |                    |                       |                 |               |              | 31        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 32        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 33        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 34        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 35        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 36        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 37        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 38        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 39        |         |             |                             |  |                            |
|   |                   |                    |                       |                 |               |              | 40        |         |             |                             |  |                            |
| Groundwater Level: 2.10m  |                   |                    |                       |                 |               |              |           |         |             |                             |  |                            |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                   |                    |                       |                 |               |              |           |         |             |                             | SUMMARY BORING LOG   |                            |
| CLINT/ OWNER: Nippon Koi - (JICA)   |                   |                    |                       |                 |               |              |           |         |             |                             | Starting Date: 14/12/2006  | Completed Date: 18/12/2006 |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                    |                       |                 |               |              |           |         |             |                             | Job No. 3351   | Sheet No. 2                |

| LOCATION: Manahara Khola  |                   |                               |                       |                 |               |              |           |         |             | BOREHOLE NO: - BH 2         |   |            |                 |                        |
|---|-------------------|-------------------------------|-----------------------|-----------------|---------------|--------------|-----------|---------|-------------|-----------------------------|---|------------|-----------------|------------------------|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY g/cm <sup>3</sup> | LIQUID LIMIT / PI (%) | CLAY / SILT (%) | SPT / OPT - N | RECOVERY (m) | DEPTH (m) | RUN (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:  | N.         |                 |                        |
|   |                   |                               |                       |                 |               |              |           |         |             |                             | GROUND ELEVATION:   | E.         | M.              | DESCRIPTION OF STARTA: |
|   | 45.92             |                               |                       | 5               |               |              | 0         |         |             |                             | Natural river bed, top about 20cm is covered by vegetation. |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 5         | 45      |             |                             | Grey silty fine sand  |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 20        | 28      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 24        | 40      |             |                             | Medium to coarse grain sand.                                |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 22        | 28      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 21        | 29      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 15        | 40      |             |                             |   |            |                 |                        |
|   | 63.49             |                               | 56                    | 99              |               |              | 17        | 20      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 17        | 24      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 19        | 28      |             |                             | Grey to dark grey sticky clay                               |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 18        | 30      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 24        | 32      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 32        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 37        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 38        | 45      |             |                             |   |            |                 |                        |
|   | 86.51             |                               | 76.75                 | 99              |               |              | 40        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 39        | 45      |             |                             | Very stiff grey to dark grey clay with some plastic nature  |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 40        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 40        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 42        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 40        | 45      |             |                             |   |            |                 |                        |
|   |                   |                               |                       |                 |               |              | 20        |         |             |                             |   |            |                 |                        |
| Groundwater Level: 0.65m  |                   |                               |                       |                 |               |              |           |         |             |                             |   |            |                 |                        |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                   |                               |                       |                 |               |              |           |         |             |                             | SUMMARY BORING LOG  |            |                 |                        |
| CLINT/ OWNER: Nippon Koei - (JICA)  |                   |                               |                       |                 |               |              |           |         |             |                             | Starting Date:  | 19/12/2006 | Completed Date: | 20/12/2006             |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                               |                       |                 |               |              |           |         |             |                             | Job No:   | 3351       | Sheet No.:      | 1                      |

| LOCATION: Manahara Khola  |                      |                                  |                          |                    |             |                 |           |         |             | BOREHOLE NO: - BH 2            |                           |                            |
|---|----------------------|----------------------------------|--------------------------|--------------------|-------------|-----------------|-----------|---------|-------------|--------------------------------|---------------------------|----------------------------|
| FIELD AND LABOTARY<br>DATA AND TEST<br>REPORTED ELSEWHERE   | WATER CONTENT<br>[%] | DRY DENSITY<br>G/CM <sup>3</sup> | LIQUID LIMIT / PI<br>[%] | CLAY / SCLT<br>[%] | SPT / CPT N | RECOVERY<br>(%) | DEPTH (m) | RPM (n) | GRAPHIC SYS | UNIFIED SOIL<br>CLASSIFICATION | COORDINATES:              | N.                         |
|   |                      |                                  |                          |                    |             |                 |           |         |             |                                | GROUND ELEVATION:         | E.                         |
|   | 78.67                |                                  |                          | 99                 |             |                 | 20        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 21        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 22        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 23        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 24        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 25        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 26        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 27        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 28        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 29        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 30        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 31        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 32        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 33        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 34        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 35        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 36        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 37        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 38        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 39        |         |             |                                |                           |                            |
|   |                      |                                  |                          |                    |             |                 | 40        |         |             |                                |                           |                            |
| Groundwater Level: 0.65m  |                      |                                  |                          |                    |             |                 |           |         |             |                                |                           |                            |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                      |                                  |                          |                    |             |                 |           |         |             |                                | SUMMARY BORING LOG        |                            |
| CLINT/ OWNER: Nippon Koi - (JICA)   |                      |                                  |                          |                    |             |                 |           |         |             |                                | Starting Date: 19/12/2006 | Completed Date: 20/12/2006 |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                      |                                  |                          |                    |             |                 |           |         |             |                                | Job No. 3351              | Sheet No. 2                |

Gery to dark grey, stiff clay some plastic nature.

Borehole Terminated at 34.45m.

| LOCATION: Manahara Khola  |                    |                  |                      |               |              |           |        |             |                             | BOREHOLE NO: - BH 3   |  |
|---|--------------------|------------------|----------------------|---------------|--------------|-----------|--------|-------------|-----------------------------|---|--|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   |                    |                  |                      |               |              |           |        |             |                             | COORDINATES: N. E. M.   |  |
| WATER CONTENT (%)   | DRY DENSITY (g/cc) | LIQUID LIMIT (%) | PLASTICITY INDEX (%) | SPT / CPT 'N' | RECOVERY (%) | DEPTH (m) | RH (%) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | DESCRIPTION OF STRATA:  |  |
|   |                    |                  |                      |               |              | 0         |        |             |                             | The location is on the left bank of manahara Khola on river bed, moist and damp area consisting of compressive soil |  |
|   |                    |                  |                      |               |              | 1         |        |             |                             | Very compressive soil/ organic type   |  |
|   |                    |                  |                      |               |              | 2         |        |             |                             | Boulders and gravels encountered embedded in silty sandy matrix.  |  |
| 45.12   | 1.26               |                  | 92                   | 9             | 50           | 3         |        |             |                             | Lead grey ,stiff to very stiff compressive silty clay with mica flakes in it  |  |
| 43.44   | C=10.43kN/m2       |                  |                      |               | 60           | 4         |        |             |                             |   |  |
| 40.89   |                    |                  |                      | 27            | 100          | 5         |        |             |                             |   |  |
|   |                    |                  |                      | 30            | 100          | 6         |        |             |                             |   |  |
|   |                    |                  |                      | 14            | 100          | 7         |        |             |                             |   |  |
|   |                    |                  |                      | 15            | 100          | 8         |        |             |                             | Grey to dark grey ,stiff compressive silty clay with mica flakes in it.   |  |
| 58.33   | 1.03               |                  |                      | 13            | 100          | 9         |        |             |                             |   |  |
|   | C=15.64kN/m2       |                  |                      |               |              | 10        |        |             |                             |   |  |
| 60.58   | 4.8                | 94               |                      | 13            | 100          | 11        |        |             |                             |   |  |
|   |                    |                  |                      | 13            | 100          | 12        |        |             |                             |   |  |
| 86.37   | 0.79               |                  |                      | 27            | 100          | 13        |        |             |                             | Grey to dark grey very stiff compressive clay with very less amount of silt.  |  |
|   | C=41.40kN/m2       |                  |                      |               |              | 14        |        |             |                             |   |  |
| 86.37   | 62.5               | 99               |                      | 30            | 100          | 15        |        |             |                             |   |  |
|   |                    |                  |                      |               |              | 16        |        |             |                             |   |  |
| 84.75   | 0.79               |                  |                      | 30            | 100          | 17        |        |             |                             |   |  |
|   | C=60.77kN/m2       |                  |                      |               |              | 18        |        |             |                             |   |  |
|   |                    |                  |                      | 29            | 100          | 19        |        |             |                             |   |  |
|   |                    |                  |                      | 28            | 100          | 20        |        |             |                             |   |  |
|   |                    |                  |                      | 30            | 100          |           |        |             |                             |   |  |
| Groundwater Observed: 1.00m   |                    |                  |                      |               |              |           |        |             |                             |   |  |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                    |                  |                      |               |              |           |        |             |                             | SUMMARY BORING LOG  |  |
| CLINT/ OWNER: Nippon Koei - (JICA)  |                    |                  |                      |               |              |           |        |             |                             | Starting Date: 13/12/2006 Completed Date: 16/12/2006  |  |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                    |                  |                      |               |              |           |        |             |                             | Job No: 3351 Sheet No: 1  |  |





| LOCATION: Hanumante Khola   |                   |                               |                       |                 |               |              |           |         |             | BOREHOLE NO: - BH 1         |   |                            |
|---|-------------------|-------------------------------|-----------------------|-----------------|---------------|--------------|-----------|---------|-------------|-----------------------------|---|----------------------------|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY G/cm <sup>3</sup> | LIQUID LIMIT / PI (%) | CLAY / SILT (%) | SPT / OPT 'N' | RECOVERY (%) | DEPTH (m) | ROW (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:  | N:                         |
|   |                   |                               |                       |                 |               |              |           |         |             |                             | GROUND ELEVATION:   | E:                         |
|   |                   |                               |                       |                 |               |              | 0         |         |             |                             | Garbage deposit grassy surface  |                            |
|   |                   |                               |                       |                 |               |              | 1         |         |             |                             | Top soil  |                            |
|   |                   |                               |                       |                 | 28            | 28           | 1         |         |             |                             | Yellowish grey non-plastic horizon consisting of sandy silty clay,                  |                            |
|   |                   |                               |                       |                 | 12            | 3            | 2         |         |             |                             | Fine to coarse grained silty sand, a boulder was encountered at a depth of 2.5-3.0m |                            |
|   |                   |                               |                       |                 | 40            | 33           | 4         |         |             |                             |   |                            |
|   | 36.46             |                               | 1.36                  |                 |               |              | 5         |         |             |                             | Very stiff dark grey, silty clay with decreasing silt content downward              |                            |
|   |                   |                               |                       |                 |               |              | 6         |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 42            | 23           | 6         |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 35            | 40           | 7         |         |             |                             |   |                            |
|   | 39.37             |                               |                       | 98              |               |              | 8         |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 34            | 23           | 8         |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 36            | 45           | 9         |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 10        |         |             |                             |   |                            |
|   | 43.68             |                               | 1.19                  |                 |               |              | 10        |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 11        |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 42            | 40           | 11        |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 85            | 28           | 12        |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 82            | 40           | 13        |         |             |                             | Hard dark grey, highly plastic clay when disturbed                                  |                            |
|   |                   |                               |                       |                 |               |              | 14        |         |             |                             |   |                            |
|   | 66.93             |                               | 0.92                  |                 |               |              | 14        |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 15        |         |             |                             | Very stiff dark grey clay with highly plastic behaviour                             |                            |
|   |                   |                               |                       |                 | 40            | 45           | 15        |         |             |                             |   |                            |
|   | 69.69             |                               |                       | 99.5            |               |              | 16        |         |             |                             | Medium to coarse grained sand layer is observed between 16.50m to 17.00m            |                            |
|   |                   |                               |                       |                 | 46            | 45           | 16        |         |             |                             |   |                            |
|   |                   |                               |                       |                 | 67            | 40           | 17        |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 18        |         |             |                             | Hard dark grey, highly plastic clay when disturbed                                  |                            |
|   | 56.08             |                               | 1.17                  | 54.5            | 99.5          | 62           | 18        |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 19        |         |             |                             |   |                            |
|   | 42.55             |                               |                       |                 |               |              | 19        |         |             |                             |   |                            |
|   |                   |                               |                       |                 |               |              | 20        |         |             |                             | Very stiff brown to dark brown highly plastic clay                                  |                            |
|   |                   |                               |                       |                 |               |              | 20        |         |             |                             |   |                            |
| Groundwater Level:  |                   | 2.40m                         |                       |                 |               |              |           |         |             |                             |   |                            |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                   |                               |                       |                 |               |              |           |         |             | SUMMARY BORING LOG          |   |                            |
| CLINT/ OWNER: Nippon Koei - (JICA)  |                   |                               |                       |                 |               |              |           |         |             | Starting Date: 07/12/2006   |   | Completed Date: 12/12/2006 |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                               |                       |                 |               |              |           |         |             | Job No. 3351                |   | Sheet No. 1                |

| LOCATION: Hanumante Khola   |                   |                               |                          |                 |               |              |           |         |             | BOREHOLE NO: - BH 1         |                   |  |    |
|---|-------------------|-------------------------------|--------------------------|-----------------|---------------|--------------|-----------|---------|-------------|-----------------------------|-------------------|--|----|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY G/cm <sup>3</sup> | LIQUID LIMIT / PI (%)    | CLAY / SILT (%) | SPT / (PT 'N' | RECOVERY (m) | DEPTH (m) | RUN (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:      | N.   |    |
|   |                   |                               |                          |                 |               |              |           |         |             |                             | GROUND ELEVATION: | E.   | M. |
| DESCRIPTION OF STARTA:  |                   |                               |                          |                 |               |              |           |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 | 56            | 40           | 20        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 | 56            | 40           | 21        |         |             |                             |                   | Very stiff brown to dark brown highly plastic clay |    |
|   | 62.16             | 1.01                          | C=83.42kN/m <sup>2</sup> |                 | 73            | 31           | 22        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 | 69            | 29           | 23        |         |             |                             |                   | Hard brown to dark brown highly plastic clay       |    |
|   | 55.21             |                               |                          | 100             | 83            | 45           | 24        |         |             |                             |                   |  |    |
|   |                   | 1.17                          |                          |                 |               |              | 25        |         |             |                             |                   |  |    |
|   | 44.03             |                               | C=48.59kN/m <sup>2</sup> |                 | UD            |              | 25        |         |             |                             |                   | Borehole Terminated at 25.75m.                     |    |
|   |                   |                               |                          |                 |               |              | 26        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 27        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 28        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 29        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 30        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 31        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 32        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 33        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 34        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 35        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 36        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 37        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 38        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 39        |         |             |                             |                   |  |    |
|   |                   |                               |                          |                 |               |              | 40        |         |             |                             |                   |  |    |
| Groundwater Observed: 2.40m   |                   |                               |                          |                 |               |              |           |         |             |                             |                   |  |    |
| PROJECT: Basic Design Study on the Project for Imparvement of Kathmandu - Bhaktapur Road in Nepal |                   |                               |                          |                 |               |              |           |         |             | SUMMARY BORING LOG          |                   |  |    |
| CLINT/ OWNER: Nippon Koi - (JICA)   |                   |                               |                          |                 |               |              |           |         |             | Starting Date: 07/12/2006   |                   | Completed Date: 12/12/2006                         |    |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                               |                          |                 |               |              |           |         |             | Job No. 3351                |                   | Sheet No. 2  |    |

| LOCATION Hanumante Khola  |                   |                               |                       |                 |             |              |           |          |             | BORFHOLE NO - BH 2          |  |                            |
|---|-------------------|-------------------------------|-----------------------|-----------------|-------------|--------------|-----------|----------|-------------|-----------------------------|--|----------------------------|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY G/cm <sup>3</sup> | LIQUID LIMIT / PL (%) | CLAY / SILT (%) | SPT / OPT-N | RECOVERY (%) | DEPTH (m) | RISK (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:   | N.                         |
|   |                   |                               |                       |                 |             |              |           |          |             |                             | GROUND ELEVATION:  | E.                         |
|   |                   |                               |                       |                 |             |              | 0         |          |             |                             | Flat, moist, grassy surface on the flood plane of Hanumante - grey to dark grey clayey sandy silt (micaceous)                              |                            |
|   | 51.63             |                               | 26.5                  | 46              | 19          | 50           | 1         |          |             |                             | Grey to dark grey very stiff clayey sandy, micaceous silt.   |                            |
|   | 26.43             |                               |                       | 15              | 17          | 10           | 2         |          |             |                             | Grey coarse silty sand embedded in brownish and light blue gravel and boulders (very little recovery)                                      |                            |
|   |                   |                               |                       |                 | 50          | 100          | 3         |          |             |                             |  |                            |
|   |                   |                               | 1.36                  |                 |             |              | 4         |          |             |                             | Hard and firm dark grey clayey silt  |                            |
|   | 34.20             |                               | C=6.83kN/m2           |                 |             |              | 5         |          |             |                             |  |                            |
|   |                   |                               |                       | 18              | 44          | 100          | 6         |          |             |                             |  |                            |
|   | 50.71             |                               | 33                    | 99              | 34          | 90           | 7         |          |             |                             | dark grey to grey very stiff to hard clay with very little amount of micaceous flakes and silt.  |                            |
|   |                   |                               |                       |                 | 17          | 100          | 8         |          |             |                             |  |                            |
|   |                   |                               |                       |                 | No Recover  |              | 9         |          |             |                             |  |                            |
|   | 53.05             |                               | 47.25                 | 98              | 29          | 100          | 10        |          |             |                             | stiff to very stiff lustrous, gray to dark grey silty clay consisting of micaceous flakes, and with characteristic of having clayey smell. |                            |
|   |                   |                               |                       |                 | No Recover  |              | 11        |          |             |                             |  |                            |
|   |                   |                               |                       |                 | 23          | 100          | 12        |          |             |                             |  |                            |
|   |                   |                               |                       |                 | 29          | 100          | 13        |          |             |                             |  |                            |
|   |                   |                               |                       |                 | 31          | 100          | 14        |          |             |                             |  |                            |
|   | 52.45             |                               | 59                    | 99              | 31          | 100          | 15        |          |             |                             | Grey to dark grey hard black clay with practically no silt.  |                            |
|   |                   |                               |                       |                 | 36          | 100          | 16        |          |             |                             |  |                            |
|   |                   |                               |                       |                 | 78          | 100          | 17        |          |             |                             |  |                            |
|   |                   |                               |                       |                 | 54          | 100          | 18        |          |             |                             |  |                            |
|   |                   |                               |                       | 99.5            | 104         | 100          | 19        |          |             |                             |  |                            |
|   | 38.76             |                               |                       |                 | 33          | 100          | 20        |          |             |                             | Non-concessive, grey fine sandy silt/mica flakes observed.   |                            |
|   |                   |                               |                       |                 |             |              |           |          |             |                             |  |                            |
| Groundwater Observed: 1.50m   |                   |                               |                       |                 |             |              |           |          |             |                             |  |                            |
| PROJECT: Basic Design Study on the Project for Improvement of Kathmandu - Bhaktapur Road in Nepal |                   |                               |                       |                 |             |              |           |          |             |                             | SUMMARY BORING LOG   |                            |
| CLINT/ OWNER: Nippon Koei - (JICA)  |                   |                               |                       |                 |             |              |           |          |             |                             | Starting Date: 07/12/2006  | Completed Date: 12/12/2006 |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                               |                       |                 |             |              |           |          |             |                             | Job No: 3351   | Sheet No. 1                |

| LOCATION: Hanumante Khola                           |                   |                                  |                       |                 |               | BOREHOLE NO: - BH 2   |  |         |             |                             |  |                    |    |            |  |                 |  |            |  |
|---|-------------------|----------------------------------|-----------------------|-----------------|---------------|---|--|---------|-------------|-----------------------------|--|--------------------|----|------------|--|-----------------|--|------------|--|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE | WATER CONTENT (%) | DRY DENSITY (g/cm <sup>3</sup> ) | LIQUID LIMIT / PI (%) | CLAY / SILT (%) | SPT / OPT - N | RECOVERY (%)  | DEPTH (m)  | RPM (m) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:   | N.                 |    |            |  |                 |  |            |  |
|   |                   |                                  |                       |                 |               |   |  |         |             |                             | GROUND ELEVATION:  | E.                 | M. |            |  |                 |  |            |  |
| DESCRIPTION OF STARTA:                              |                   |                                  |                       |                 |               |   |  |         |             |                             |  |                    |    |            |  |                 |  |            |  |
|   | 36.31             |                                  | 61.21                 | 99.5            |               |   | 93 100<br>90 100<br>82 100<br>76 100<br>84 100<br>20<br>21<br>22<br>23<br>24<br>25<br>26<br>27<br>28<br>29<br>30<br>31<br>32<br>33<br>34<br>35<br>36<br>37<br>38<br>39<br>40 |         |             |                             | Greenish gray - gray cohesive/ compressive/hard clay with characteristic clayey smell devoid of mica flakes.<br><br>Borehole Terminated at 25.00m. |                    |    |            |  |                 |  |            |  |
| Groundwater Observed:                               |                   |                                  |                       |                 |               | 1.70m   |  |         |             |                             |  |                    |    |            |  |                 |  |            |  |
| PROJECT:  |                   |                                  |                       |                 |               | Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal. |  |         |             |                             |  | SUMMARY BORING LOG |    |            |  |                 |  |            |  |
| CLINT/ OWNER:                                       |                   |                                  |                       |                 |               | Nippon Koi - (JICA)   |  |         |             |                             |  | Starting Date:     |    | 13/12/2006 |  | Completed Date: |  | 16/12/2006 |  |
| CONSULTING ENGINEERS:                               |                   |                                  |                       |                 |               | ITECO Nepal in Association with ICGS  |  |         |             |                             |  | Job No.            |    | 3351       |  | Sheet No.       |  | 2          |  |

| LOCATION: Hanumante Khola   |                   |                                  |                  |                |               |              |           |        |             | BOREHOLE NO: - BH 3        |  |                            |
|---|-------------------|----------------------------------|------------------|----------------|---------------|--------------|-----------|--------|-------------|----------------------------|--|----------------------------|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY (g/cm <sup>3</sup> ) | LIQUID LIMIT (%) | PLASTICITY (%) | SPT / OPT 'N' | RECOVERY (%) | DEPTH (m) | ROD No | GRAPHIC S/S | UNIFIED S/M CLASSIFICATION | COORDINATES:   | N:                         |
|   |                   |                                  |                  |                |               |              |           |        |             |                            | GROUND ELEVATION:  | E:                         |
| DESCRIPTION OF STRATA:  |                   |                                  |                  |                |               |              |           |        |             |                            |  |                            |
|   |                   |                                  |                  |                |               |              | 0         |        |             |                            | Cultivated land represented by grey silty clay   |                            |
|   |                   |                                  |                  |                |               |              | 1         |        |             |                            | Dark grey to brown silty clay with micaceous flakes, compressive in nature                         |                            |
|   |                   |                                  |                  |                |               |              | 2         |        |             |                            | Dark grey to grey silty clay consisting of fine micaceous flakes.                                  |                            |
|   |                   |                                  |                  |                | 52            | 60           | 2         |        |             |                            | Boulders and gravels encountered embedded in grey silty and sandy matrix. very less silt and clay. |                            |
|   |                   |                                  |                  |                | 37            | 40           | 3         |        |             |                            |  |                            |
|   |                   | 1.48                             |                  |                |               |              | 4         |        |             |                            | Grey, very stiff clayey silt and sand.   |                            |
|   | 32.66             | C=5.20kN/m <sup>2</sup>          |                  |                | 46            | 40           | 4         |        |             |                            |  |                            |
|   |                   |                                  |                  | 20             |               |              | 5         |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 67            | 50           | 5         |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 41            | 47           | 6         |        |             |                            | Dark grey to grey, very stiff clay with very little silt in it.                                    |                            |
|   |                   | 1.38                             |                  |                |               |              | 7         |        |             |                            |  |                            |
|   | 28.41             | C=5.54kN/m <sup>2</sup>          |                  |                | 77            | 100          | 7         |        |             |                            |  |                            |
|   |                   |                                  |                  | 98             |               |              | 8         |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 54            | 50           | 8         |        |             |                            |  |                            |
|   | 30.48             | 52.51                            |                  | 30             |               |              | 9         |        |             |                            | Grey sharp textured, very stiff micaceous silty sand.  |                            |
|   |                   |                                  |                  |                | 45            | 60           | 9         |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 57            | 100          | 10        |        |             |                            |  |                            |
|   |                   | 1.14                             |                  |                |               |              | 11        |        |             |                            | Grey to dark grey very stiff clay with very little silt.   |                            |
|   | 44.41             | C=16.09 kN/m <sup>2</sup>        |                  |                | 59            | 100          | 11        |        |             |                            |  |                            |
|   |                   |                                  |                  | 61             |               |              | 12        |        |             |                            |  |                            |
|   |                   |                                  |                  | 99             |               |              | 12        |        |             |                            |  |                            |
|   |                   |                                  |                  | 2              |               |              | 13        |        |             |                            | Grey to dark grey stiff silty sand with very less clay   |                            |
|   | 53.49             |                                  |                  |                | 27            | 100          | 13        |        |             |                            |  |                            |
|   |                   |                                  |                  |                |               |              | 14        |        |             |                            | Grey, stiff silty clay/ clayey silt recovery not possible (fast rod driving)                       |                            |
|   | 49.40             |                                  |                  | 4              |               |              | 15        |        |             |                            | stiff sand, and sandy clayey silt  |                            |
|   |                   |                                  |                  |                | 29            | 100          | 15        |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 50            | 100          | 16        |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 72            | 100          | 17        |        |             |                            | Dark grey to grey very stiff clay with very very little silt.                                      |                            |
|   |                   |                                  |                  |                | 76            | 100          | 18        |        |             |                            |  |                            |
|   | 31.83             | 60.28                            |                  | 99             |               |              | 18        |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 40            | 100          | 19        |        |             |                            |  |                            |
|   |                   |                                  |                  |                | 50            | 100          | 20        |        |             |                            |  |                            |
| Groundwater Observed: 1.70m   |                   |                                  |                  |                |               |              |           |        |             |                            |  |                            |
| PROJECT: Basic Design Study on the Project for Improvement of Kathmandu - Bhaktapur Road in Nepal |                   |                                  |                  |                |               |              |           |        |             |                            | SUMMARY BORING LOG   |                            |
| CLIENT/ OWNER: Nippon Kai - (JICA)  |                   |                                  |                  |                |               |              |           |        |             |                            | Starting Date: 13/12/2006  | Completed Date: 16/12/2006 |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICES  |                   |                                  |                  |                |               |              |           |        |             |                            | Job No: 3351   | Sheet No: 1                |

| LOCATION: Hanumante Khola (On the Edge of Left Bank of Khola)                                     |                   |                                  |                       |                 |               |              |                                  |         |             | BOREHOLE NO: - BH 3         |   |    |
|---|-------------------|----------------------------------|-----------------------|-----------------|---------------|--------------|----------------------------------|---------|-------------|-----------------------------|---|----|
| FIELD AND LABOTARY DATA AND TEST REPORTED ELSEWHERE   | WATER CONTENT (%) | DRY DENSITY (g/cm <sup>3</sup> ) | LIQUID LIMIT / PL (%) | CLAY / SILT (%) | SPT / CPT - N | RECOVERY (%) | DEPTH (m)                        | RQD (%) | GRAPHIC SYS | UNIFIED SOIL CLASSIFICATION | COORDINATES:  | N. |
|   |                   |                                  |                       |                 |               |              |                                  |         |             |                             | GROUND ELEVATION:   | E. |
| DESCRIPTION OF STARTA:  |                   |                                  |                       |                 |               |              |                                  |         |             |                             |   |    |
|   | 65.32             |                                  | 64                    | 100             |               |              | 20<br>21<br>22<br>23<br>24<br>25 |         |             |                             | Grey to dark grey very stiff Clay with Characteristic compressive and soft nature |    |
| Borehole Terminated at 25.00m..   |                   |                                  |                       |                 |               |              |                                  |         |             |                             |   |    |
| Groundwater Observed: 1.70m   |                   |                                  |                       |                 |               |              |                                  |         |             |                             |   |    |
| PROJECT: Basic Design Study on the Project for Imporvement of Kathmandu - Bhaktapur Road in Nepal |                   |                                  |                       |                 |               |              |                                  |         |             | SUMMARY BORING LOG          |   |    |
| CLIENT/ OWNER: Nippon Koi - (JICA)  |                   |                                  |                       |                 |               |              |                                  |         |             | Starting Date: 13/12/2006   | Completed Date: 16/12/2006  |    |
| CONSULTING ENGINEERS: ITECO Nepal in Association with ICGS  |                   |                                  |                       |                 |               |              |                                  |         |             | Job No. 3351                | Sheet No. 2   |    |