

COPYRIGHT NOTICE

This geotechnical log and its associated data (the Document) is licensed by the Cross River Rail Delivery Authority under the [Creative Commons Attribution 4.0 Licence](#) (CC BY 4.0). When reusing the Document, in whole or in part, please attribute as follows: "(c) *Cross River Rail Delivery Authority 2023, licensed under the CC BY 4.0 Licence, prepared by Soil Surveys*". This licence does not apply to logos or trademarks.

LIMITATION OF LIABILITY

The CC BY 4.0 Licence contains a comprehensive Disclaimer of Warranties and Limitation of Liability. In addition, please note that this Document was prepared for the Cross River Rail Delivery Authority use only. Reuse of the Document by anyone for any other purpose could result in error and/or loss. You should obtain professional advice before making decisions based on the contents of the Document.

When reproducing any part of this Document, you must also reproduce this limitation of liability notice in addition to the italicised attribution statement above.

Retrieved from the Queensland Geotechnical Database <http://qgd.org.au/>



Milton: ph +61 7 3369 6000 brisbane@soilsurveys.com.au
Gold Coast: ph +61 7 5500 0465 goldcoast@soilsurveys.com.au
Northern Rivers: ph +61 7 5523 4577 northernrivers@soilsurveys.com.au
Mackay: ph +61 7 4942 2907 mackay@soilsurveys.com.au

Location Number: BH 304

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 12/12/2011

Easting: 503302 Northing: 6960819 RL: -13.62 m

Logger: DA/DT Operator: DA Machine: Scout 2

Page: 1 OF 5

| Drilling Method | | Depth | Graphic | Description | Weathering | Strength Estimated | Defect Spacing | Rec (%) | RQD | Samples and Remarks |
|-----------------|----|-------|---------|---|------------|--------------------|----------------|---------|-----|---------------------|
| TC | WB | | | | | | | | | |
| | | 1.0 | | Silty CLAY (CH) Very soft, high plasticity, dark grey. | | | | | | |
| | | 2.0 | | SAND (SP) Loose, fine to coarse grained, grey and brown. | | | | | | |
| | | 4.0 | | Sandy GRAVEL (GP) Loose, fine to medium size, grey and brown, fine to coarse grained sand. | | | | | | |
| | | 5.0 | | SAND (SP) Loose, fine to coarse grained, grey and brown. | | | | | | |
| | | 7.0 | | Sandy GRAVEL (GP) Medium dense, fine to medium size, grey and brown, fine to coarse grained sand. | | | | | | |
| | | 8.0 | | Gravelly SAND (SP) Loose, fine to coarse grained, grey and brown, fine to medium size gravel. | | | | | | |
| | | 10.0 | | Sandy GRAVEL (GP) Loose, fine to medium size, grey and brown, fine to coarse grained sand. | | | | | | |

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Defects - 1.54m : F,60°,P,R,O,C

| Depth (m) | Type | Dip (Deg) | Planarity | Roughness | Aperture | Width |
|-----------|-----------------------------|-----------|-------------------|------------------|------------|--------------------------|
| | B - Bedding | | C - Curvilinear | L - Slickensides | C - Closed | C - Clay |
| | C - Clay seam | | D - Discontinuous | P - Polished | F - Filled | F - Iron Oxide |
| | F - Foliation | | P - Planar | R - Rough | N - Clean | K - Kaolinite |
| | H - Schistosity | | S - Subplanar | S - Smooth | O - Open | L - Limonite |
| | J - Joint | | T - Stepped | V - Very rough | S - Stain | Q - Quartz |
| | L - Cleavage | | | | | S - Secondary mineral |
| | R - Fracture | | | | | U - Unidentified mineral |
| | S - Shear zone | | | | | W - Weathered rock |
| | T - Contact | | | | | X - Carbonaceous |
| | V - Vein | | | | | Z - Clean |
| | Z - Decomposed Zone | | | | | |
| | DI - Drilling induced break | | | | | |

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered

Rock Strength

VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50

SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:31 8.30.002 Developed by Dajgeel



Easting: 503302 Northing: 6960819 RL: -13.62 m

Logger: DA/DT Operator: DA Machine: Scout 2

| Drilling Method | | | | Depth | Graphic | Description | Weathering | Strength Estimated | Defect Spacing | Rec (%) | RQD | Samples and Remarks |
|-----------------|----|----|-------|-------|---------|---|------------|--------------------|----------------|---------|-----|---|
| TC | WB | FR | NM/LC | | | | | | | | | |
| | | | | 11.0 | | Sandy GRAVEL (GP) Loose, fine to medium size, grey and brown, fine to coarse grained sand. (continued) | | | | | | |
| | | | | 11.40 | | TUFF (SW) Moderately strong, yellow brown. | | | | | | |
| | | | | 12.0 | | | | | | | | |
| | | | | 12.40 | | | | | | | | |
| | | | | 12.90 | | SANDSTONE, coarse grained, pale grey, granular, thinly bedded, closely spaced fractures, some fine gravel clasts. | SW | | | | | 12.47 m; J, 10°, P, R, O, W 12.52 m; 20°, P, R, O, W 12.66 m; 20°, P, R, O, W 12.92m, Is50 = 0.37 MPa |
| | | | | 13.0 | | | | | | | | |
| | | | | 13.25 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 13.54 m; 25°, P, R, O, C |
| | | | | 13.68 | | | | | | | | |
| | | | | 14.0 | | Interbedded SANDSTONE and CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, thinly bedded, closely spaced fractures. | | | | 100 | 95 | 13.9m, Is50 = 0.93 MPa 13.84 m; 55°, P, R, O, C 13.90 m; 10°, S, S, O, C 14.1m, Is50 = 1.21 MPa |
| | | | | 14.13 | | | | | | | | |
| | | | | 14.81 | | SANDSTONE, medium grained, pale grey banded dark grey, granular, thinly bedded, closely spaced fractures. Interbedded dark grey siltstone from 13.69m to 13.74m, coarse sand lenses from 13.98m to 14.02m. | | | | | | 14.56m, Is50 = 0.52 MPa 14.58 m; R, 40°, P, V, O, W |
| | | | | 15.0 | | | | | | | | |
| | | | | 16.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 15.56 m; 10°, P, R, O, Z 15.63 m; B, 10°, P, R, O, Z 15.75 m; B, 5°, P, R, O, Z 15.81 m; DI, 5°, P, S, O, Z 15.88 m; B, 10°, P, R, O, Z 15.90 m; B, 2°, P, R, O, Z 15.91 m; B, 3°, P, R, O, Z 16.12 m; R, 5°, P, R, O, W |
| | | | | 16.40 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, very closely to closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. Siltstone beds from 15.51m to 15.55m, 15.68m to 15.7m, 15.82m to 15.85m. Fine sandstone band from 16.04m to 16.09m. | | | | | | 16.39 m; DI, 10°, S, V, O, W |
| | | | | 17.0 | | | | | | | | |
| | | | | 18.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, very closely to closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | 100 | 83 | 16.79m, Is50 = 1.73 MPa 17.60 m; J, 12°, T, R, O, Z 18.13m, Is50 = 1.84 MPa |
| | | | | 18.70 | | | | | | | | 18.39 m; DI, 15°, S, V, O, W |
| | | | | 19.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported with a sandstone band from 19.10m to 19.44m. | FR | | | | | 18.87 m; DI, 10°, P, R, O, W 18.92 m; DI, 5°, P, V, O, W 19.00 m; DI, 5°, P, R, O, Z |
| | | | | 19.44 | | | | | | | | 19.42 m; DI, 10°, S, V, O, Z |
| | | | | 20.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, | | | | | | 19.73 m; DI, 10°, U, V, O, Z 19.84m, Is50 = 0.57 MPa |

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NM/LC. 3) Borehole grouted on completion.

Defects - 1.54m : F, 60° P, R, O, C

| Depth (m) | Type | Dip (Deg) | Planarity | Roughness | Aperture | Width |
|-----------|-----------------|-----------|-----------------------------|------------------|------------|--------------------------|
| | B - Bedding | | C - Curvilinear | L - Slickensides | C - Closed | C - Clay |
| | Cl - Clay seam | | D - Discontinuous | P - Polished | F - Filled | F - Iron Oxide |
| | F - Foliation | | P - Planar | R - Rough | N - Clean | K - Calcite |
| | H - Schistosity | | S - Subplanar | S - Smooth | O - Open | L - Limonite |
| | J - Joint | | T - Stepped | V - Very rough | S - Stain | Q - Quartz |
| | L - Cleavage | | R - Fracture | | | S - Secondary mineral |
| | U - Undulating | | S - Shear zone | | | U - Unidentified mineral |
| | | | T - Contact | | | W - Weathered rock |
| | | | V - Vein | | | X - Carbonaceous |
| | | | Z - Decomposed Zone | | | Z - Clean |
| | | | DI - Drilling induced break | | | |

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered

Rock Strength

VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50

SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <DrawingFiles> 21/05/2012 14:31 8.30.002 Developed by Datigel

Water First Noted Water Steady Level



Milton: ph +61 7 3369 6000 brisbane@soilsurveys.com.au
Gold Coast: ph +61 7 5500 0465 goldcoast@soilsurveys.com.au
Northern Rivers: ph +61 7 5523 4577 northernrivers@soilsurveys.com.au
Mackay: ph +61 7 4942 2907 mackay@soilsurveys.com.au

Location Number: BH 304

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 12/12/2011

Page: 3 OF 5

Easting: 503302 Northing: 6960819 RL: -13.62 m
Logger: DA/DT Operator: DA Machine: Scout 2

| Drilling Method | | | | Depth | Graphic | Description | Weathering | Strength Estimated | Defect Spacing | Rec (%) | RQD | Samples and Remarks |
|-----------------|----|----|-------|-------|---------|--|------------|--------------------|----------------|---------|-----|--|
| TC | WB | RR | NM/LC | | | | | | | | | |
| | | | | 20.50 | | very closely to closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | FR | | | | | 20.02 m; B, 2°, P, S, O, C 20.10 m; B, 5°, P, S, O, C 20.19 m; J, 65°, C, S, O, Z |
| | | | | 21.0 | | Interbedded SANDSTONE and SILTSTONE, alternating pale grey and dark grey, granular, laminated, moderately widely spaced fractures. (continued) | | | | 100 | 94 | 20.77m, Is50 = 0.9 MPa 20.73 m; DI, 10°, U, R, O, W |
| | | | | 22.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are coarse gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 21.81 m; J, 30°, C, R, O, Z |
| | | | | 22.04 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 22.13m, Is50 = 1.28 MPa 22.10 m; R, 5°, P, V, O, W |
| | | | | 22.66 | | CONGLOMERATE, coarse grained, dark grey speckled white grey, granular, medium bedded, moderately widely spaced fractures. Clasts are fine gravel size sub-rounded, low sphericity, siltstone with some sandstone and quartz. | | | | 100 | 94 | 23.40 m; J, 10°, P, R, O, Z |
| | | | | 23.0 | | CONGLOMERATE, coarse grained, dark grey speckled white grey, granular, medium bedded, moderately widely spaced fractures. Clasts are fine gravel size sub-rounded, low sphericity, siltstone with some sandstone and quartz. | | | | | | 23.40 m; J, 10°, P, R, O, Z |
| | | | | 24.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are coarse gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 24.46m, Is50 = 0.94 MPa 24.43 m; J, 70°, S, R, O, Z |
| | | | | 24.09 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are coarse gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | | | 25.06m, Is50 = 1.7 MPa 25.22m, Is50 = 1.2 MPa 25.15 m; J, 12°, P, S, O, Z |
| | | | | 24.40 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. Coarse gravel has lower sphericity. Siltstone from 25.66m to 25.76m. | | | | | | 25.50 m; J, 22°, P, S, O, Z 25.71 m; DI, 5°, U, R, O, Z 25.89 m; DI, 5°, P, S, O, C |
| | | | | 25.0 | | CONGLOMERATE, coarse grained, pale grey speckled dark grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. Coarse gravel has lower sphericity. Siltstone from 25.66m to 25.76m. | | | | | | 26.11 m; DI, 85°, U, R, O, W |
| | | | | 25.90 | | SANDSTONE, medium grained, pale grey, traces of banded dark grey and black, granular, thinly bedded, closely spaced to moderately widely spaced fractures, fine size gravel from 26.91m to 27.28m. | | | | 100 | 90 | 26.45m, Is50 = 1.32 MPa 26.41 m; DI, 5°, P, R, O, Z 26.52 m; DI, 5°, P, R, O, Z 26.71m, Is50 = 1.46 MPa |
| | | | | 26.0 | | SANDSTONE, medium grained, pale grey, traces of banded dark grey and black, granular, thinly bedded, closely spaced to moderately widely spaced fractures, fine size gravel from 26.91m to 27.28m. | | | | | | 26.82 m; J, 10°, P, R, O, Z |
| | | | | 27.0 | | SANDSTONE, medium grained, pale grey, traces of banded dark grey and black, granular, thinly bedded, closely spaced to moderately widely spaced fractures, fine size gravel from 26.91m to 27.28m. | | | | | | 27.79 m; B, 2°, P, S, O, Z |
| | | | | 27.46 | | SANDSTONE, fine grained, pale grey banded dark grey, granular, laminated, closely spaced fractures. | | | | | | 28.19 m; B, 2°, P, S, O, Z |
| | | | | 27.74 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | | | 28.46 m; B, 2°, P, S, O, Z |
| | | | | 28.0 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | | | 29.39 m; B, 3°, P, S, O, Z |
| | | | | 29.0 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | 100 | 100 | |
| | | | | 30.0 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | | | |

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Defects - 1.54m : F, 60°, P, R, O, C

| Depth (m) | Type | Dip (Deg) | Planarity | Roughness | Aperture | Width |
|-----------|-----------------------------|-------------------|------------------|------------|--------------------------|-------|
| | B - Bedding | C - Curvilinear | L - Slickensides | C - Closed | C - Clay | |
| | F - Foliation | D - Discontinuous | P - Polished | F - Filled | F - Iron Oxide | |
| | H - Schistosity | P - Planar | R - Rough | N - Clean | K - Calcite | |
| | J - Joint | S - Subplanar | S - Smooth | O - Open | L - Limonite | |
| | L - Cleavage | T - Stepped | V - Very rough | S - Stain | Q - Quartz | |
| | R - Fracture | U - Undulating | | | S - Secondary mineral | |
| | S - Shear zone | | | | U - Unidentified mineral | |
| | T - Contact | | | | W - Weathered rock | |
| | V - Vein | | | | X - Carbonaceous | |
| | Z - Decomposed Zone | | | | Z - Clean | |
| | DI - Drilling induced break | | | | | |

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh
FR - Fresh
VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50
SPT
Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:G.L.B. Log. SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:31 8.30.002 Developed by Datigel

Water First Noted Water Steady Level



| Drilling Method | | | | Depth | Graphic | Description | Weathering | Strength Estimated | Defect Spacing | Rec (%) | RQD | Samples and Remarks |
|-----------------|----|----|-------|-------|---------|---|------------|--------------------|----------------|---------|-----|--|
| TC | WB | RR | NM/LC | | | | | | | | | |
| | | | | 31.0 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. (continued) | FR | | | 100 | 100 | 30.15 m; J, 85°, P, R, O, Z 30.22 m; DI, 5°, P, S, O, Z |
| | | | | 32.0 | | | | | | 100 | 100 | 30.68 m; J, 45°, P, S, O, Z 30.86 m; DI, 75°, U, V, O, Z 30.97 m; B, 10°, S, R, O, Z 31.1m, Is50 = 1.59 MPa 31.14 m; B, 80°, P, S, O, Z 31.37 m; B, 10°, P, S, O, Z |
| | | | | 33.0 | | | | | | 100 | 100 | 32.12 m; B, 10°, P, S, O, Z 32.47 m; B, 10°, P, S, O, Z 32.67 m; B, 10°, P, S, O, Z |
| | | | | 34.0 | | | | | | 100 | 82 | 33.24 m; B, 10°, P, S, O, Z 33.87 m; DI, 80°, S, R, O, Z 34.18 m; B, 0°, P, S, O, Z 34.53 m; B, 0°, P, S, O, Z 34.62 m; B, 0°, P, S, O, Z 34.94 m; B, 20°, P, S, O, Z |
| | | | | 35.0 | | | | | | 100 | 80 | 35.25 m; B, 20°, P, S, O, Z 35.55 m; B, 20°, P, S, O, Z 35.66 m; B, 20°, P, S, O, Z 35.83 m; B, 20°, P, S, O, Z 35.91 m; J, 25°, P, R, O, K 36.07 m; B, 30°, P, S, O, Z 36.22 m; B, 30°, P, S, O, Z 36.31 m; J, 70°, P, S, O, Z 36.37 m; J, 30°, P, R, O, K 36.52 m; J, 81°, U, S, O, Z |
| | | | | 36.0 | | | | | | 100 | 80 | 36.72 m; J, 85°, U, S, O, Z 36.76 m; B, 20°, P, S, O, Z 37.00 m; V, 30°, P, S, C, X 37.05 m; V, 80°, P, S, C, K 37.37 m; B, 10°, C, S, O, Z 37.62 m; B, 10°, P, S, O, Z |
| | | | | 37.0 | | | | | | 100 | 80 | 37.86 m; V, 70°, S, R, O, X 38.41 m; DI, 20°, S, R, O, Z 38.56 m; B, 20°, P, S, O, Z 38.70 m; J, 80°, S, R, O, Z 38.80 m; J, 10°, P, S, O, Z 38.95 m; DI, 30°, P, S, O, Z 38.99 m; J, 20°, C, R, O, Z 39.07 m; B, 25°, P, S, O, Z 39.27 m; J, 30°, P, S, O, Z |
| | | | | 38.0 | | CONGLOMERATE, coarse grained, dark grey speckled light grey, granular, medium bedded, closely spaced fractures. Clasts are medium gravel sized sub-rounded siltstone, sandstone and quartz, clast supported. | | | | 100 | 80 | 39.48 m; J, 70°, P, S, O, Z 39.57 m; J, 45°, P, S, O, Z 39.78 m; J, 80°, S, R, O, Z 39.87 m; B, 30°, P, S, O, Z |
| | | | | 39.0 | | Interlaminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | | | |
| | | | | 39.70 | | MUDSTONE, fine grained, white grey, cryptocrystalline, thinly laminated, closely spaced | | | | | | |
| | | | | 40.0 | | | | | | | | |

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NM/LC. 3) Borehole grouted on completion.

Defects - 1.54m : F, 60°, P, R, O, C

| Depth (m) | Type | Dip (Deg) | Planarity | Roughness | Aperture | Fill |
|-----------|-----------------------------|-----------|-------------------|------------------|------------|--------------------------|
| | B - Bedding | | C - Curvilinear | L - Slickensides | C - Closed | C - Clay |
| | F - Fault | | D - Discontinuous | P - Polished | F - Filled | F - Iron Oxide |
| | H - Schistosity | | P - Planar | R - Rough | N - Clean | K - Calcite |
| | J - Joint | | S - Subplanar | S - Smooth | O - Open | L - Limonite |
| | L - Cleavage | | T - Stepped | V - Very rough | S - Stain | Q - Quartz |
| | R - Fracture | | U - Undulating | | | S - Secondary mineral |
| | S - Shear zone | | | | | U - Unidentified mineral |
| | T - Contact | | | | | W - Weathered rock |
| | V - Vein | | | | | X - Carbonaceous |
| | Z - Decomposed Zone | | | | | Z - Clean |
| | DI - Drilling induced break | | | | | |

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength

VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50

SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL SURVEYS 00: LIBRARY 2012:05:GLB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:31 8.30.002 Developed by Dargel



Location Number: BH 304

Project Number: 110-12936

Project Name: Cross River Rail

Location: Brisbane

Client: AECOM

Date: 12/12/2011

Page: 5 OF 5

Easting: 503302 Northing: 6960819 RL: -13.62 m

Logger: DA/DT Operator: DA Machine: Scout 2

| Drilling Method | | | | Depth | Graphic | Description | Weathering | Strength Estimated | Defect Spacing | Rec (%) | RQD | Samples and Remarks |
|-----------------|----|----|------|-------|---------|--|------------|--------------------|----------------|---------|-----|------------------------------|
| TC | WB | FR | NMLC | | | | | | | | | |
| | | | | 39.93 | | fractures, some siltstone and fine sandstone laminae present. | | | | | | 39.93 m: DI, 60°, P, R, O, Z |
| | | | | 41.0 | | Inter laminated SILTSTONE and SANDSTONE, fine grained, alternating light grey and dark grey, granular, thinly laminated, closely spaced to moderately widely spaced fractures, mudstone laminae present. | | | | | | |
| | | | | | | BOREHOLE BH 304 TERMINATED AT 40.00 m | | | | | | |
| | | | | 42.0 | | | | | | | | |
| | | | | 43.0 | | | | | | | | |
| | | | | 44.0 | | | | | | | | |
| | | | | 45.0 | | | | | | | | |
| | | | | 46.0 | | | | | | | | |
| | | | | 47.0 | | | | | | | | |
| | | | | 48.0 | | | | | | | | |
| | | | | 49.0 | | | | | | | | |
| | | | | 50.0 | | | | | | | | |

SOIL SURVEYS 00:LIBRARY 2012:05:G.LB Log SOIL SURVEY BOREHOLE LOG 111-12936 NEW.GPJ <<DrawingFiles>> 21/05/2012 14:31 8.30.002 Developed by Datigel

Comments:
1) Drilled from floating barge - all depths measured from river bed level. 2) Note: the coring method used was NQ3 not NMLC. 3) Borehole grouted on completion.

Defects - 1.54m : F,60°,P,R,O,C

| Depth (m) | Type | Dip (deg) | Planarity | Roughness | Aperture | Wells |
|-----------|-----------------------------|-----------|-------------------|------------------|------------|--------------------------|
| | B - Bedding | | C - Curvilinear | L - Slickensides | C - Closed | C - Clay |
| | C - Clay seam | | D - Discontinuous | P - Polished | F - Filled | F - Iron Oxide |
| | F - Foliation | | P - Planar | R - Rough | N - Clean | K - Calcite |
| | H - Schistosity | | S - Subplanar | S - Smooth | O - Open | L - Limonite |
| | J - Joint | | T - Stepped | V - Very rough | S - Stain | Q - Quartz |
| | L - Cleavage | | U - Undulating | | | S - Secondary mineral |
| | R - Fracture | | | | | U - Unidentified mineral |
| | S - Shear zone | | | | | W - Weathered rock |
| | T - Contact | | | | | X - Carbonaceous |
| | V - Vein | | | | | Z - Clean |
| | Z - Decomposed Zone | | | | | |
| | DI - Drilling induced break | | | | | |

Weathering Grades

RS - Residual Soil
XW - Extremely weathered
DW - Distinctly weathered
SW - Slightly weathered
FR - Fresh

Rock Strength

VW - Very weak
W - Weak
MS - Medium strong
S - Strong
VS - Very strong
ES - Extremely strong

Samples

U50

SPT

Disturbed Sample

Approved: _____
Date: _____

SOIL_SURVEYS_00.LIBRARY.GLB Grctbl DG PHOTO CORE PHOTO 4 PER PAGE 111-12936 NEW.GPJ <<DrawingFile>> 26/04/2012 14:47 8.2.856 Developed by Datgel




TITLE

AECOM
Brisbane
Cross River Rail
Core Photo - BH 304

| | | | |
|------------|--------------|-----------|------------|
| DRAWN | DT | DATE | 26/04/2012 |
| CHECKED | CB | DATE | 26/04/2012 |
| SCALE | Not To Scale | | A4 |
| PROJECT No | 110-12936 | FIGURE No | 1/2 |



| | | | | |
|---|---|----------------------|-----------------|---------------|
|  | TITLE AECOM Brisbane Cross River Rail Core Photo - BH 304 | DRAWN DT | DATE 26/04/2012 | |
| | | CHECKED CB | DATE 26/04/2012 | |
| | | SCALE Not To Scale | | A4 |
| | | PROJECT No 110-12936 | | FIGURE No 2/2 |

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: **CRR**
PROJECT No.: **110-12936**

BH No.: **304**
Test No.: **1**
Date: **13/12/2011**

Packer type: Double
Packer pressure: 2000kPa
Gauge pressures measured in: kPa
Tested by: JI

Vertical depth to:
(below river bed)

| | |
|----------------------------|-------|
| Top of test section (m): | 26.00 |
| Base of test section (m): | 28.50 |
| Centre of test section(m): | 27.25 |
| Base of casing (m): | 25.00 |
| Ground water (m) | TIDAL |

| | |
|--------------------------------------|-------|
| Depth of centre of test section (m): | 27.25 |
| Length of test section (m): | 2.50 |

| | |
|--------------------------------------|----|
| Gauge Height above ground level (m): | |
| Hole Diameter in test section (mm) | 75 |

| 1st period | Time (mins) | 0 | 5 | 10 | 15 | Average |
|-----------------------|-----------------------|--------------|-------|-------|-------|--------------|
| Gauge Pressure 100 | Flow reading | 525.0 | 526.5 | 526.9 | 527.4 | Flow (l/min) |
| | Water Take | 0.00 | 1.50 | 0.40 | 0.50 | 0.160 |
| 2nd period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 200 | Flow reading | 532.0 | 533.4 | 535.5 | 536.9 |
| Water Take | | 0.00 | 1.40 | 2.10 | 1.40 | 0.327 |
| 3rd period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 300 | Flow reading | 543.5 | 543.6 | 544.4 | 549.0 |
| Water Take | | 0.00 | 0.10 | 0.80 | 4.60 | 0.367 |
| 4th period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 200 | Flow reading | 550.8 | 552.8 | 557.0 | 561.0 |
| Water Take | | 0.00 | 2.00 | 4.20 | 4.00 | 0.680 |
| 5th period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 100 | Flow reading | | | | |
| Water Take | | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 |

| Period | Flow (q) (l/min) | Gauge Press (kPa) | Gauge Press (m of water) | Friction Loss (m)* | | Total Head (m) | Lugeon Value | Perm. (m/s) |
|--------|---------------------|----------------------|-----------------------------|--------------------|---------------|-------------------|-----------------|----------------|
| | | | | Basic | In extra rods | | | |
| 1st | 0.160 | 100.00 | 10.220 | 0.000 | 0.000 | 37.470 | 0.174 | 1.90E-08 |
| 2nd | 0.327 | 200.00 | 20.440 | 0.000 | 0.000 | 47.690 | 0.280 | 3.05E-08 |
| 3rd | 0.367 | 300.00 | 30.660 | 0.000 | 0.000 | 57.910 | 0.259 | 2.82E-08 |
| 4th | 0.680 | 200.00 | 20.440 | 0.000 | 0.000 | 47.690 | 0.583 | 6.35E-08 |
| 5th | 0.000 | 100.00 | 10.220 | 0.000 | 0.000 | 37.470 | 0.000 | 0.00E+00 |

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

Note - flows in period 1 & 2 adjusted for leakage at pressure head. Leakage past packer in stage 4 - test abandoned

IN-SITU PACKER PERMEABILITY TEST RESULT

PROJECT: CRR
PROJECT No.: 110-12936

BH No.: 304
Test No.: 2
Date: 13/12/2011

Packer type: Double
Packer pressure: 2000kPa
Gauge pressures measured in: kPa
Tested by: JI

Vertical depth to:
(below river bed)

| | |
|----------------------------|-------|
| Top of test section (m): | 17.00 |
| Base of test section (m): | 19.50 |
| Centre of test section(m): | 18.25 |
| Base of casing (m): | 16.00 |
| Ground water (m) | TIDAL |

| | |
|--------------------------------------|-------|
| Depth of centre of test section (m): | 18.25 |
| Length of test section (m): | 2.50 |

| | |
|--------------------------------------|----|
| Gauge Height above ground level (m): | |
| Hole Diameter in test section (mm) | 75 |

| 1st period | Time (mins) | 0 | 5 | 10 | 15 | Average |
|-----------------------|-----------------------|--------------|-------|-------|-------|--------------|
| Gauge Pressure 100 | Flow reading | 571.0 | 572.1 | 572.4 | 572.7 | Flow (l/min) |
| | Water Take | 0.00 | 1.10 | 0.30 | 0.30 | 0.113 |
| 2nd period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 200 | Flow reading | 575.0 | 575.5 | 575.8 | 576.2 |
| | Water Take | 0.00 | 0.50 | 0.30 | 0.40 | 0.080 |
| 3rd period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 400 | Flow reading | 581.5 | 582.1 | 582.5 | 583.5 |
| | Water Take | 0.00 | 0.60 | 0.40 | 1.00 | 0.133 |
| 4th period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure 600 | Flow reading | 550.8 | 552.8 | 557.0 | 561.0 |
| | Water Take | 0.00 | 2.00 | 4.20 | 4.00 | 0.680 |
| 5th period | Time (mins) | 0 | 5 | 10 | 15 | Average |
| | Gauge Pressure | Flow reading | | | | Flow (l/min) |
| | Water Take | 0.00 | 0.00 | 0.00 | 0.00 | 0.000 |

| Period | Flow (q) (l/min) | Gauge Press (kPa) | Gauge Press (m of water) | Friction Loss (m)* | | Total Head (m) | Lugeon Value | Perm. (m/s) |
|--------|---------------------|----------------------|-----------------------------|--------------------|---------------|-------------------|-----------------|----------------|
| | | | | Basic | In extra rods | | | |
| 1st | 0.113 | 100.00 | 10.220 | 0.000 | 0.000 | 28.470 | 0.163 | 1.77E-08 |
| 2nd | 0.080 | 200.00 | 20.440 | 0.000 | 0.000 | 38.690 | 0.084 | 9.20E-09 |
| 3rd | 0.133 | 400.00 | 40.880 | 0.000 | 0.000 | 59.130 | 0.092 | 1.00E-08 |
| 4th | 0.680 | 600.00 | 61.320 | 0.000 | 0.000 | 79.570 | 0.349 | 3.80E-08 |
| 5th | 0.000 | 0.00 | 0.000 | 0.000 | 0.000 | 18.250 | 0.000 | 0.00E+00 |

*Where friction loss is assumed to be negligible.

N.B. Pressure Conversion: 1 bar = 100 kPa = 14.503 psi

Note - leakage past packer between periods 3 & 4 - test abandoned