

BOREHOLE: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 1 OF 11 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16

| Drilling | | | Sampling | | Field Material Description | | | | | | |
|----------|------------------------|-------|----------------|----------|----------------------------|-----------|-------------|-------------|---|--------------------|---|
| METHOD | PENETRATION RESISTANCE | WATER | DEPTH (metres) | DEPTH RL | SAMPLE OR FIELD TEST | RECOVERED | GRAPHIC LOG | USCS SYMBOL | SOIL/ROCK MATERIAL DESCRIPTION | MOISTURE CONDITION | STRUCTURE AND ADDITIONAL OBSERVATIONS |
| ADT | NDD | H | 0 | NGWO | | | | | ASPHALT FILL: Sandy GRAVEL fine to medium grained, angular, grey FILL: Gravelly COBBLES orange-brown, sandstone | | ROAD SURFACE BASECOURSE FILL WEATHERED BEDROCK |
| | | | 2.44 | | | | | | | | |
| | | | 0.45 | | | | | | | | |
| | | | 2.17 | | | | | | | | |
| | | | | | | | | | SANDSTONE orange-brown, coarse grained For Continuation Refer to Sheet 2 | | |
| | | | 1 | | | | | | | | |
| | | | 2 | | | | | | | | |
| | | | 3 | | | | | | | | |
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| | | | 8 | | | | | | | | |
| | | | 9 | | | | | | | | |
| | | | 10 | | | | | | | | |

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 GAP gINT FN. F01a
 RL3

CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-Over Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 2 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | | Defect Information | | | | |
|--------------------------|----------------|--|---|----------------------------|----------|-------------|--|--------------------|--|--|-----------------------------|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING | INFERRED STRENGTH $f_s(50)$ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) | |
| | | | | 0 | | | | | | | 10 30 100 300 1000 3000 | |
| | | | | 0.75 | | | Continuation of Sheet 1 | | | | | |
| HQ3 No water loss | 100 100 | 90 90 98 95 100 100 | 90 (100) 90 (100) 98 (98) 95 (100) 100 (100) 100 (100) | 1.91 | 1 | | SANDSTONE coarse grained, orange and pale grey, crossbedded at 30-40°, iron stained | MW SW | 0.85 m: J, 60°, Pl, Ro, Cn 1.14 m: J, 60°, Pl, Ro, Cn 1.23 m: B, 30°, Pl, Ro, clay Ct 1.41 m: J, 70°, Pl, Ro, Cn | | | |
| | | | | 1.50 1.26 | 2 | | from 1.50m: faintly iron stained | | | 2.10 m: J, 70°, Pl, Ro, Cn 2.47 m: J, 70°, Pl, Ro, Cn | | |
| | | | | 2.25 0.60 | 3 | | from 2.25m: pale grey, infrequent patchy iron-staining | FR | | | | |
| | | | | 4.43 -1.31 | 4 | | SANDSTONE fine to medium grained, pale grey, crossbedded at 30-35°, infrequent patchy iron-staining | | 4.40-4.42 m: CS, 20°, 20 mm, crushed rock with clay coating 4.43-4.46 m: CS, 30-35°, 30 mm, crushed rock with clay coating 4.58 m: B, 30°, Pl, Ro, clay Vr 4.93 m: J, 60°, Un, Ro, Cn | | | |
| | | | | 6.55 -3.16 | 5 | | SANDSTONE coarse grained, pale grey, crossbedded at 30-35°, infrequent patchy iron-staining, with some siltstone laminations | | 5.34 m: B, 30°, Pl, Ro, clay Vr 5.82 m: B, 30°, Pl, Ro, clay Vr | | | |
| | | | | 7 | 6 | | | | 6.53-6.55 m: CZ, clayey sand and crushed sandstone rock 6.86 m: B, 25°, Pl, Ro, clay Vr | | | |
| | | | | 8 | 7 | | | | 8.05 m: B, 30°, Pl, Ro, clay Vr 8.14 m: B, 40°, Pl, Ro, clay Vr | | | |
| | | | | 9 | 8 | | | | 8.54 m: B, 40°, Pl, Ro, clay Vr | | | |
| | | | | 9.40 -5.65 | 9 | | SANDSTONE medium grained, massive, pale grey, with some carbonaceous flecks | | 9.32 m: B, 20°, Pl, Ro, clay Vr | | | |
| | | | | 10 | 10 | | | | | | | |

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GAP gINT FN. F02a
RL3

BOREHOLE: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

PROJECT № PCS 00013/10701

HOLE DEPTH: 100.00 m

PROJECT: Sydney Metro City and Southwest SURFACE RL: 2.57 m DATUM: AHD CONTRACTOR: Groundtest
LOCATION: Barangaroo - Cross-Over Cavern INCLINATION: -61° DIRECTION: 339° LOGGED: LJH / MB DATE: 9/9/16
PROJECT NoPCS 00013/10701 HOLE DEPTH: 100.00 m CHECKED: HB DATE: 27/9/16

SHEET: 3 OF 11

REV: C

DRILL RIG: Explora

CONTRACTOR: Groundtest

LOGGED: LJH / MB DA

CHECKED: HB

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GAP gINT FN. F02a
RL3

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 4 OF 11 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | | Defect Information | | | |
|----------|------------------|-----|-----------|----------------------------|-----------------|-------------|--|---|-------------------------------------|--|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING | INFERRRED STRENGTH $I_s(50)$ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) |
| | | | | | | | | EL 0.03 Vl 0.1 L 0.3 M 1 H 3 VH 10 EH | | | 10 30 100 300 1000 3000 |
| HQ3 | 80% Water RETURN | | | 20 | | | SANDSTONE medium grained, pale grey, crossbedded at 30-40° | FR | | 20.38 m: J, 80°, Pl, Ro, Cn, length 240mm | |
| | | 100 | 100 (100) | | 20.50 -15.36 | | SANDSTONE medium grained, massive, pale grey, with some carbonaceous flecks and siltstone clasts up to 20mm | | | 20.80 m: J, 30°, Pl, Ro, Cn | |
| | | 80 | 45 (45) | 21 | | | | | | 21.25 m: J, 45°, Pl, Ro, clay Vr | |
| | | | | 22 | 22.00 -16.67 | | CORE LOSS | | | 21.61 m: J, 50°, Pl, Ro, clay Vr 21.70-21.85 m: SZ, 70°, crushed sandstone in clay matrix | |
| | | 100 | 35 (75) | 22.40 -17.02 | | | SANDSTONE medium grained, massive, pale grey | FR | | 22.50-22.65 m: CZ, crushed rock (gravel size fragments) 22.55 m: J, 60°, Pl, Ro, Cn 22.65 m: J, 30°, Pl, Ro, clay Vr 22.90 m: J, 70°, Pl, Ro, Cn | |
| | | | | 23 | | | | | | 23.13-23.33 m: Jx2, 90°, Pl, Ro, Cn | |
| | | 100 | 35 (75) | 23.35 -17.85 | | | SANDSTONE medium grained, pale grey, crossbedded at 30-40° | | | 23.45 m: J, 40°, Pl, Ro, Cn | |
| | | | | 24 | 24.00 -18.42 | | from 24.00 - 24.60m and 25.20 - 25.70m: indistinctly cross-bedded | | | 23.77-24.80 m: SZ, 70-90°, crushed sandstone in clay matrix 23.77 m: J, 40°, Pl, Ro, clay Vr 23.77-24.80 m: SZ, 70-90°, crushed sandstone in clay matrix | |
| | | | | 25 | | | | | | 25.04 m: J, 35°, Pl, Ro, clay Vr | |
| | | 100 | 40 (95) | 26 | 26.00 -20.17 | | from 26.00m: with some siltstone laminations at 30° | | | 25.25 m: J, 40°, Pl, Ro, clay Ct, 10 mm 25.35-25.75 m: SZ, 40-70°, crushed sandstone in clay matrix | |
| | | | | 26.70 -20.78 | | | from 26.70m: sub-rounded siltstone clasts up to 30mm | | | 25.88 m: J, 45°, Pl, Ro, Cn | |
| | | | | 27 | | | | | | 26.42 m: B, 20°, Pl, Ro, clay Vr | |
| | | 100 | 100 (100) | 27.70 -21.66 | | | SANDSTONE medium grained, massive, pale grey, with some siltstone flecks | | | 26.80 m: B, 25°, Pl, Ro, clay Vr | |
| | | | | 28 | | | | | | 27.44 m: B, 20°, Pl, Ro, clay Vr | |
| | | 100 | 100 (100) | 28.50 -22.36 | | | from 28.50 - 28.70m: with some indistinct siltstone laminations at 30° | | | 27.80 m: J, 80°, Pl, Ro, clay Vr, 200 mm | |
| | | | | 29 | | | | | | 28.26 m: J, 45°, Pl, Ro, Cn | |
| | | | | 30 | 29.60 -23.32 | | from 29.60 - 29.85m: with some indistinct siltstone laminations at 30° | | | 28.35 m: J, 45°, Pl, Ro, clay Ct, 6 mm | |

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RL3

CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-Over Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 5 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | Defect Information | | | | | |
|----------|------------------|-----|-----------|----------------------------|----------|-------------|--|--|------------------------------------|---|---|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING EL.0.03 V.0.1 L.0.3 M.1 H.3 VH.10 EH | INFERRED STRENGTH $I_s(50)$ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) | |
| HQ3 | 80% Water RETURN | 100 | 90 (100) | 30 | -24.02 | 30.40 | SANDSTONE medium grained, massive, pale grey, with some siltstone flecks from 30.40-30.60m: some indistinct siltstone laminations at 30° | FR | 29.93 m: B, 20°, Pl, Ro, Cn | 30.71 m: J, 40°, Pl, Ro, Cn | 30.15 m: J, 80°, Pl, Ro, clay Vr, length 100mm 31.20 m: J, 20-50°, Pl, Ro, Cn 31.23 m: J, 20-50°, Pl, Ro, Cn 31.30 m: J, 20-50°, Pl, Ro, Cn 31.62 m: J, 45°, Pl, Ro, Cn | 10 30 100 300 1000 3000 |
| | | 100 | 90 (100) | 31 | -24.85 | 31.35 | from 31.35 - 31.62m: some indistinct siltstone laminations at 30° | | | 32.20 m: J, 65°, Pl, Ro, clay Vr | 32.69 m: J, 60°, Pl, Ro, Cn | |
| | | 100 | 90 (100) | 32 | -25.59 | 32.20 | from 32.20 - 32.60m: some indistinct siltstone laminations at 30° | | | 33.15-33.18 m: CZ, 50°, sandy clay 33.24 m: J, 40°, Pl, Ro, Cn 33.42 m: B, 25°, Pl, Ro, Cn | | |
| | | 100 | 90 (100) | 33 | -26.86 | 33.65 | SANDSTONE medium to coarse grained, pale grey, cross-bedded at 30-40° | | | 33.73 m: J, 70°, Pl, Sm, clay Vr 33.85 m: B, 30°, Pl, Sm, clay Vr | | |
| | | 100 | 60 (100) | 34 | -28.57 | 35.60 | from 35.60 - 36.55m: with some fine quartz gravel | | | 34.15 m: J, 85°, Pl, Ro, clay Vr, length 360mm 34.33-34.90 m: SZ, 30-70°, crushed sandstone in clay matrix | | |
| | | 100 | 90 (100) | 35 | -30.14 | 37.40 | from 37.40 - 37.90m: with some fine quartz gravel | | | 34.95 m: B, 20°, Pl, Sm, clay Vr 35.10-35.20 m: Bx3, 20-40°, sp = 40 mm, Pl, Ro, clay Cn-Vr 35.30 m: J, 45°, Pl, Ro, clay Vr 35.38 m: J, 20°, Pl, Ro, Cn 35.48 m: J, 20°, Pl, Ro, Cn 35.66 m: J, 40°, Pl, Ro, Cn | | |
| | | 100 | 90 (100) | 36 | -31.72 | 39.20 | from 39.20 - 39.90m: with some fine to medium quartz gravel | | | 36.55-36.65 m: Bx2, 30°, sp = 80 mm, Pl, Ro, Cn 36.90 m: B, 35°, Pl, Ro, clay Vr | | |
| | | 100 | 70 (100) | 37 | -31.72 | | | | | 37.20 m: J, 85°, Pl, Ro, Cn, length 450mm 37.40-37.60 m: Jx5, 30°, sp = 20-60 mm, Pl, Ro, Cn 37.40-37.44 m: CZ, 35°, crushed sandstone in clayey sand matrix 37.40-37.60 m: Jx5, 30°, sp = 20-60 mm, Pl, Ro, Cn 37.40-37.44 m: CZ, 35°, crushed sandstone in clayey sand matrix | | |
| | | 100 | 70 (100) | 38 | -31.72 | | | | | 38.84 m: J, 50°, Pl, Ro, Cn 38.94 m: B, 35°, Pl, Ro, Cn | | |
| | | 100 | 70 (100) | 39 | -31.72 | | | | | 39.32 m: J, 45°, Pl, Ro, Cn 39.63 m: J, 45°, Pl, Ro, Cn 39.80 m: J, 60°, Pl, Ro, Cn 39.90-40.15 m: Bx4, 35°, sp = 60 mm, Pl, Ro, clay | | |
| | | 100 | 70 (100) | 40 | -31.72 | | | | | | | |

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CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-Over Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 6 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | | Defect Information | | | |
|----------|------------------|-----|-----------|----------------------------|----------|-------------|--|--------------------|---------------------------------|--|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING | INFERRED STRENGTH $f_s(50)$ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) |
| HQ3 | 80% Water RETURN | | | 40 | | | SANDSTONE medium to coarse grained, pale grey, cross-bedded at 30-40° | FR | | 40.27 m: J, 20°, Pl, Ro, Cn 40.35 m: J, 45°, Pl, Ro, Cn | 10 30 100 300 1000 3000 |
| | | | | 100 (70) | 70 (100) | | | | | 40.88 m: J, 80°, Pl, Ro, Cn, length 280mm | |
| | | | | 41 | | | | | | 41.20 m: J, 40°, Pl, Ro, Cn | |
| | | | | 42 | | | | | | 41.70-42.35 m: Jx8, 30-40°, sp = 60-150 mm, Pl, Ro, clay | |
| | | | | 43 | | | | | | 42.35-42.37 m: CZ, crushed rock (gravel size) 42.50-42.53 m: CZ, crushed rock (gravel size) 42.50-42.80 m: Bx6, 10-30°, sp = 20-100 mm, Pl, Ro, clay Vr 42.50-42.53 m: CZ, crushed rock (gravel size) | |
| | | | | 100 (75) | 75 (95) | | | | | 43.40 m: J, 40°, Pl, Ro, Cn 43.49 m: B, 35°, Pl, Ro, clay Vr 43.57 m: J, 60°, Pl, Ro, Cn 43.72 m: B, 40°, Pl, Ro, Cn 43.86 m: J, 75°, Pl, Ro, Cn, length 320mm | |
| | | | | 44 | | | | | | 44.24 m: J, 80°, Pl, Ro, Cn, length 400mm | |
| | | | | 45 | | | | | | 44.53 m: J, 75°, Pl, Ro, Cn, length 160mm | |
| | | | | 46 | | | | | | 44.80 m: J, 45°, Pl, Ro, Cn 44.90 m: J, 45°, Pl, Ro, Cn | |
| | | | | 95 (46.43) | 46.43 | | CORE LOSS | | | 45.35 m: B, 30°, Pl, Ro, Cn | |
| | | | | 46.60 | | | | | | 45.60 m: B, 40°, Pl, Ro, clay Vr 45.67 m: J, 45°, Pl, Ro, clay Vr 45.77 m: B, 30°, Pl, Ro, clay Ct, 3 mm 45.84 m: B, 35°, Pl, Ro, Cn | |
| | | | | -38.19 | | | SANDSTONE medium to coarse grained, pale grey, cross-bedded at 30-40° with some carbonaceous laminations | FR | | 46.12 m: B, 25°, Pl, Ro, carbonaceous Vr 46.30-46.43 m: Bx3, 30°, sp = 40 mm, Pl, Ro, clay | |
| | | | | 47 | | | | | | 46.68 m: J, 85°, Pl, Ro, sandy clay Vr, length 160mm 46.77 m: J, 80°, Un, Ro, carbonaceous Vr 46.80-47.00 m: Bx3, 35°, sp = 60 mm, Pl, Ro, sandy clay | |
| | | | | 100 (85) | 85 (95) | | | | | 47.07 m: J, 65°, Pl, Ro, sandy clay Vr 47.18-47.55 m: SZ, 45°, crushed sandstone in sandy clay matrix | |
| | | | | 48 | | | | | | 47.79 m: J, 45°, Pl, Ro, sandy clay Vr 47.85 m: B, 25°, Pl, Ro, carbonaceous Vr | |
| | | | | 49 | | | | | | 48.10 m: J, 55°, Pl, Ro, Cn 48.22 m: J, 80°, Pl, Ro, clay Vr, length 180mm | |
| | | | | 49.60 | 49.60 | | from 49.60 - 49.65m: with some fine quartz gravel | | | 48.52 m: J, 60°, Pl, Ro, Cn 48.56 m: B, 15°, Pl, Sm, clay Ct, 3 mm 48.70 m: J, 60-80°, Un, Ro, Cn, length 150mm 48.88 m: B, 30°, Pl, Sm, clay Vr 48.95 m: B, 30°, Pl, Ro, clay Vr 49.00 m: J, 70°, Pl, Ro, Cn 49.04 m: B, 30°, Pl, Sm, clay Vr 49.10-49.30 m: Jx4, 35-50°, sp = 50 mm, Pl, Ro, clay Cn-Vr | |
| | | | | 40.81 | | | | | | 49.60 m: J, 90°, Un, Ro, Cn, length 280mm 49.77 m: J, 35°, Pl, Ro, Cn | |

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 GAP gINT FN. F02a
 RL3

CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-Over Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 7 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | | Defect Information | | | |
|----------|------------------|-----|-----------|----------------------------|----------|-------------|---|--------------------|--|--|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING | INFERRED STRENGTH $f_s(50)$ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) |
| HQ3 | 80% Water RETURN | | | 50 | | | SANDSTONE medium to coarse grained, pale grey, cross-bedded at 30-40° with some carbonaceous laminations from 50.65- 51.15m: with some fine to medium quartz gravel | FR | Vf 0.03 L 0.1 M 0.3 H 1.0 VH 1.0 EH | 50.09 m: J, 60°, Un, Ro, Cn 50.30 m: B, 30°, Pl, Ro, clay Vr 50.58 m: J, 50°, Pl, Ro, Cn 50.65 m: B, 15°, Pl, Ro, clay Vr 51.00 m: J, 75°, Pl, Ti, length 300mm 51.18 m: B, 50°, Pl, Ro, carbonaceous Vr 51.20-51.35 m: Bx3, 20-30°, sp = 30-60 mm, Pl, Ro, carbonaceous Vr 51.42 m: B, 20°, Pl, Ro, clay Vr 51.74 m: J, 85°, Pl, Ti, length 520mm 52.31 m: B, 25°, Pl, Ro, carbonaceous Vr 52.40-52.75 m: SZ, 60°, displaced sandstone in clay matrix | 10 30 100 300 1000 3000 |
| | | | | 51 | | | SANDSTONE fine to medium grained, grey, cross-bedded at 25-40° from 51.20-51.22m: dark grey siltstone at 51.28m: elongated siltstone clasts up to 40mm long | | | 52.86 m: B, 35°, Pl, Ro, carbonaceous Vr 53.38 m: B, 30°, Pl, Ro, carbonaceous Vr | |
| | | | | 52 | | | | | | 54.25 m: J, 70°, Pl, Ro, Cn 54.45 m: J, 75-90°, Ro, Cn, curved, length 430mm 54.69 m: B, 20°, Pl, Ro, carbonaceous Vr S18005; 54.70 m 54.78-54.95 m: SZ, 45°, displaced sandstone in clay matrix | |
| | | | | 53 | | | | | | 55.18 m: B, 30°, Pl, Ro, clay Vr 55.42 m: B, 10°, Pl, Sm, carbonaceous Vr 55.80 m: J, 70°, Pl, Sm, Cn 56.04 m: B, 20°, Pl, Ro, clay Vr | |
| | | | | 54 | | | from 54.00m - 55.42m: with some carbonaceous laminations at 30° | | | 56.04 m: B, 20°, Pl, Ro, clay Vr 56.85 m: J, 80°, Pl, Ro, Cn, length 300mm S18007; 57.50 m | |
| | | | | 55 | | | from 55.00m - 55.25m: with some siltstone clasts up to 10mm | | | 58.11 m: B, 25°, Pl, Sm, clay Vr | |
| | | | | 56 | | | LAMINITE dark grey siltstone (70%) interlaminated with grey, fine grained sandstone (30%) at 20° | | | 58.75 m: J, 55°, Pl, Ro, Cn 58.88 m: B, 15°, Pl, Ro, clay Vr | |
| | | | | 57 | | | SANDSTONE medium grained, massive, pale grey from 56.20 - 56.65m: with some carbonaceous flecks | | | 59.35 m: J, 60°, St, Ro, Cn | |
| | | | | 58 | | | | | | | |
| | | | | 59 | | | | | | | |
| | | | | 60 | | | | | | | |

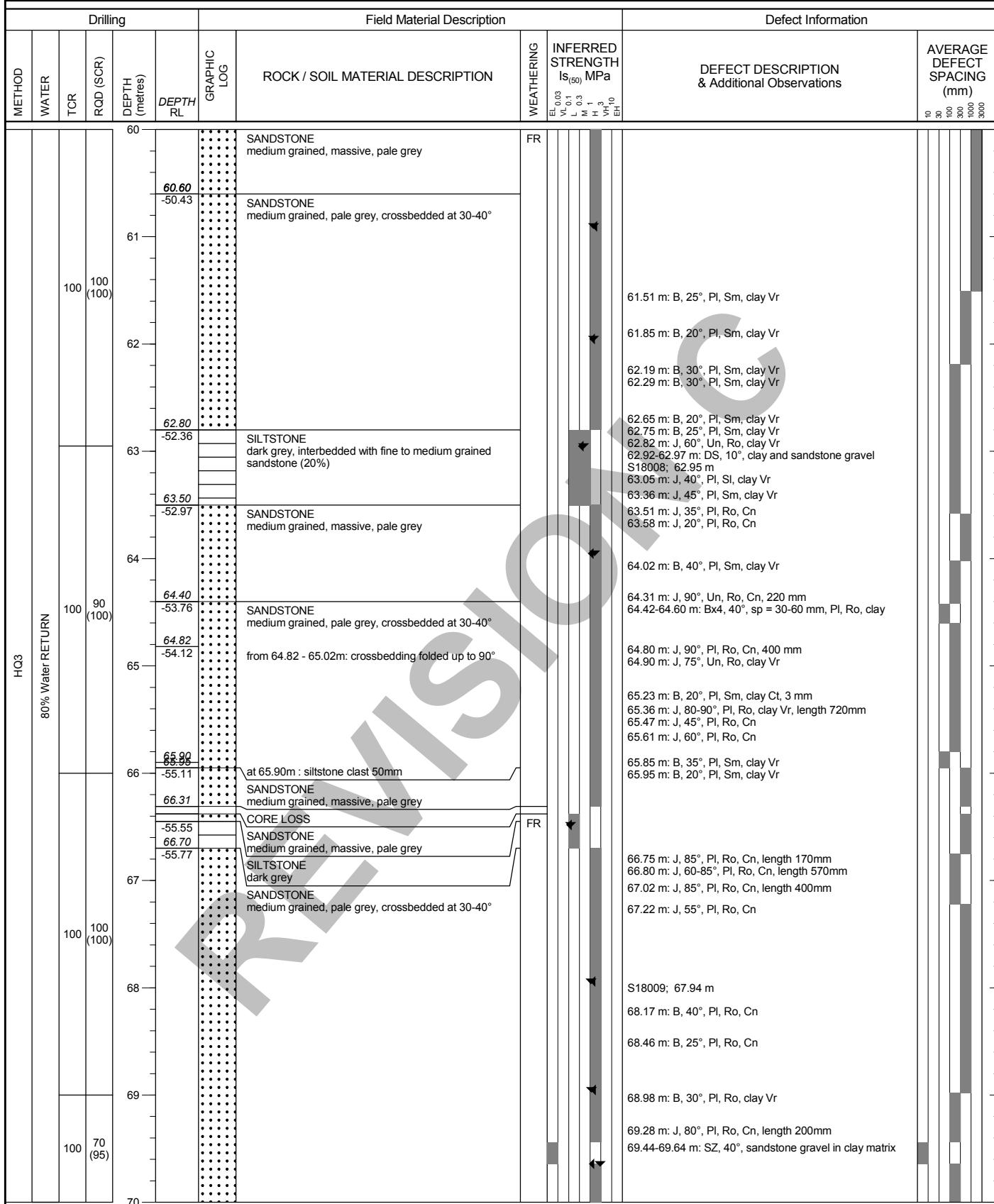
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GAP gINT FN. F02a
RL3

CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-Over Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 8 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16



This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 9 OF 11 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16

| Drilling | | | | Field Material Description | | | | Defect Information | | | |
|----------|-------|-----|-----------|----------------------------|-----------|-------------|--|--|--|---|--|
| METHOD | WATER | TCR | ROD (SCR) | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | ROCK / SOIL MATERIAL DESCRIPTION | WEATHERING | INFERRRED STRENGTH Is ₍₅₀₎ MPa | DEFECT DESCRIPTION & Additional Observations | AVERAGE DEFECT SPACING (mm) |
| | | | | | | | | EL 0.03 V 0.1 L 0.3 M 1 H 3 VH 10 EH | | | 10 30 100 300 1000 3000 |
| | | | | 70 | 70 (95) | | SANDSTONE medium grained, massive, pale grey at 70.58: siltstone clast | FR | 69.98 m: J, 80°, Pl, Ro, Cn, length 350mm 70.29 m: J, 50°, Pl, Ro, Cn 70.35 m: J, 65°, Pl, Ro, clay Ct, 3 mm | | |
| | | | | 71 | | | | | | 70.93 m: J, 45°, Pl, Ro, clay Vr 71.13 m: J, 50°, Pl, Ti | |
| | | | | 72 | 100 (90) | | | | | 71.40-71.60 m: SZ, 65°, sandstone gravel in clay matrix 71.64 m: J, 75°, Pl, Ro, clay Vr S18010; 71.75 m 71.91 m: J, 65°, Pl, Ro, Cn | |
| | | | | 73 | | | | | | 72.65 m: J, 70°, Pl, Ro, clay Vr | |
| | | | | 74 | 100 (100) | | LAMINITE dark grey siltstone (75%) interbedded with fine to medium grained sandstone (25%), disturbed bedding | | | 74.33 m: B, 20°, Pl, Ro, clay Vr 74.58 m: B, 10°, Pl, Ro, clay Vr | |
| | | | | 75 | | | SANDSTONE fine to medium grained, grey, with some siltstone laminations at 20° | | | | |
| | | | | 76 | 100 (100) | | SANDSTONE medium to coarse grained, pale grey, crossbedded at 25-40° from 75.10 - 75.45m: with some fine to medium quartz gravel at 75.90m: with some elongated siltstone clasts up to 30mm from 76.10 - 76.20m: with some siltstone laminations at 10-20° from 76.22 - 76.28m: with some siltstone clasts and fine to medium quartz gravel at 76.45m: with some siltstone clasts and fine to medium quartz gravel | | | 75.58 m: B, 40°, Pl, Sm, clay Vr 76.00 m: J, 65°, Pl, Ro, Cn 76.11 m: B, 10°, Pl, Ro, Cn 76.41 m: B, 30°, Pl, Sm, clay Vr | |
| | | | | 77 | | | | | | | |
| | | | | 78 | 100 (100) | | from 77.85 - 78.10m: with some siltstone laminations at 20-30° from 78.10 - 78.17m: with some siltstone clasts and fine to medium quartz gravel | | | 77.84 m: B, 30°, Pl, Ro, clay Vr 77.97 m: B, 30°, Pl, Ro, clay Vr 78.07 m: J, 40°, Pl, Ro, Cn 78.10 m: B, 25°, Pl, Sm, clay Vr | |
| | | | | 79 | 100 (100) | | | | | 79.87 m: B, 30°, Pl, Sm, clay Vr | |
| | | | | 80 | | | | | | | |

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 GAP gINT FN. F02a
RL3

BOREHOLE: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 10 OF 11 REV: C

PROJECT: Sydney Metro City and Southwest
LOCATION: Barangaroo - Cross-Over Cavern
PROJECT NoPCS 00013/10701

SURFACE RL: 2.57 m DATUM: AHD
INCLINATION: -61° DIRECTION: 339°
HOLE DEPTH: 100.00 m

DRILL RIG: Explora

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

CHECKED: HB

PROJECT REF: SS 55516/107/0

POLE DEI III. 100.00 m

SEARCHED. INDEXED.

DATE: 2/15/10

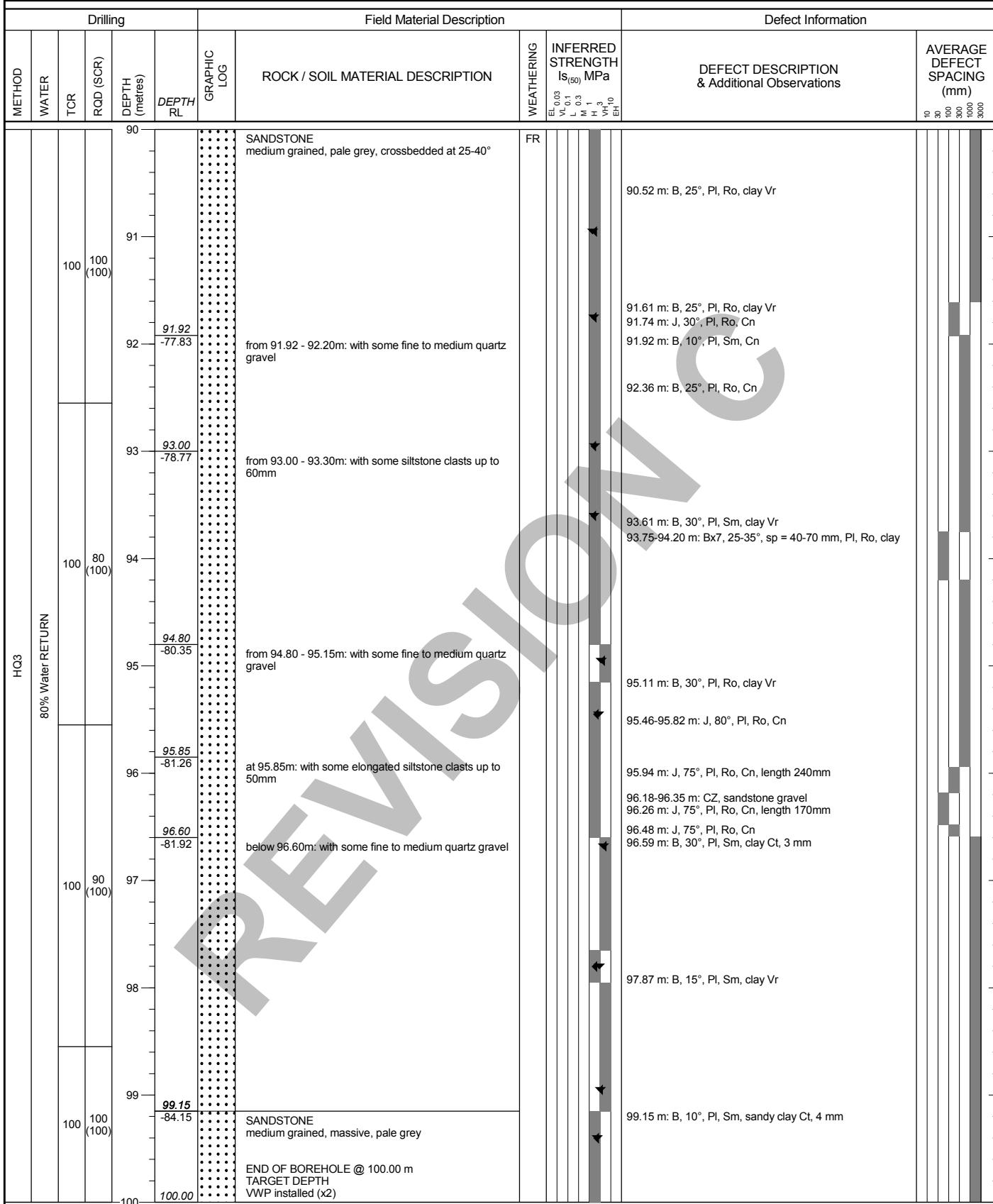
This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

GAP gINT FN. F02a
RL3

CLIENT: Transport for NSW
 PROJECT: Sydney Metro City and Southwest
 LOCATION: Barangaroo - Cross-OVER Cavern
 PROJECT NoPCS 00013/10701

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
 SURFACE RL: 2.57 m DATUM: AHD
 INCLINATION: -61° DIRECTION: 339°
 HOLE DEPTH: 100.00 m

SHEET: 11 OF 11 REV: C
 DRILL RIG: Explora
 CONTRACTOR: Groundtest
 LOGGED: LJH / MB DATE: 9/9/16
 CHECKED: HB DATE: 27/9/16



This report of borehole must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 1 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

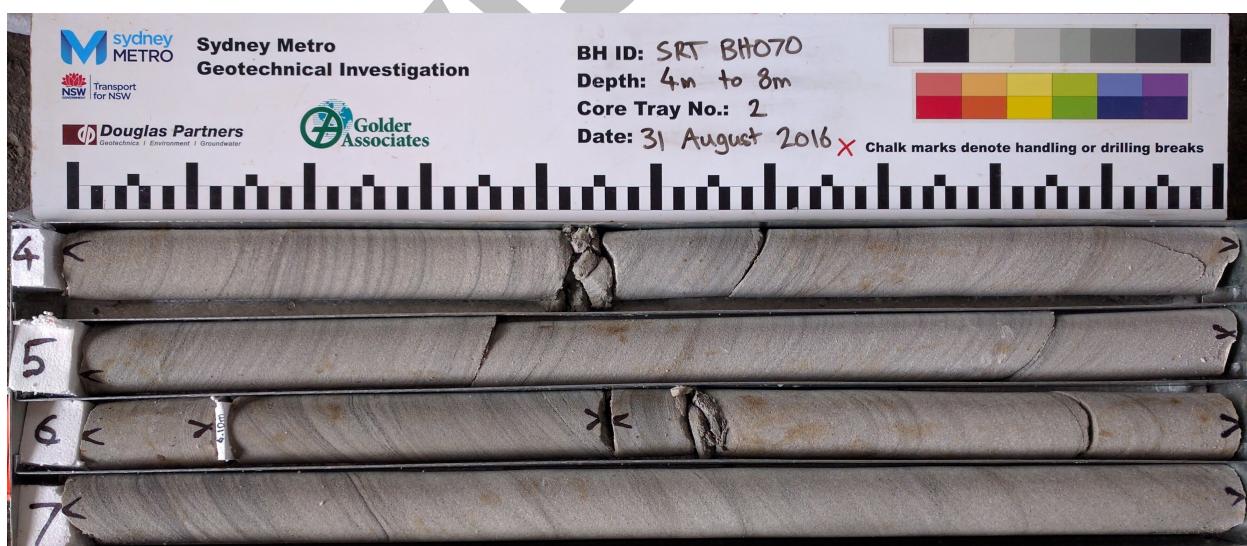
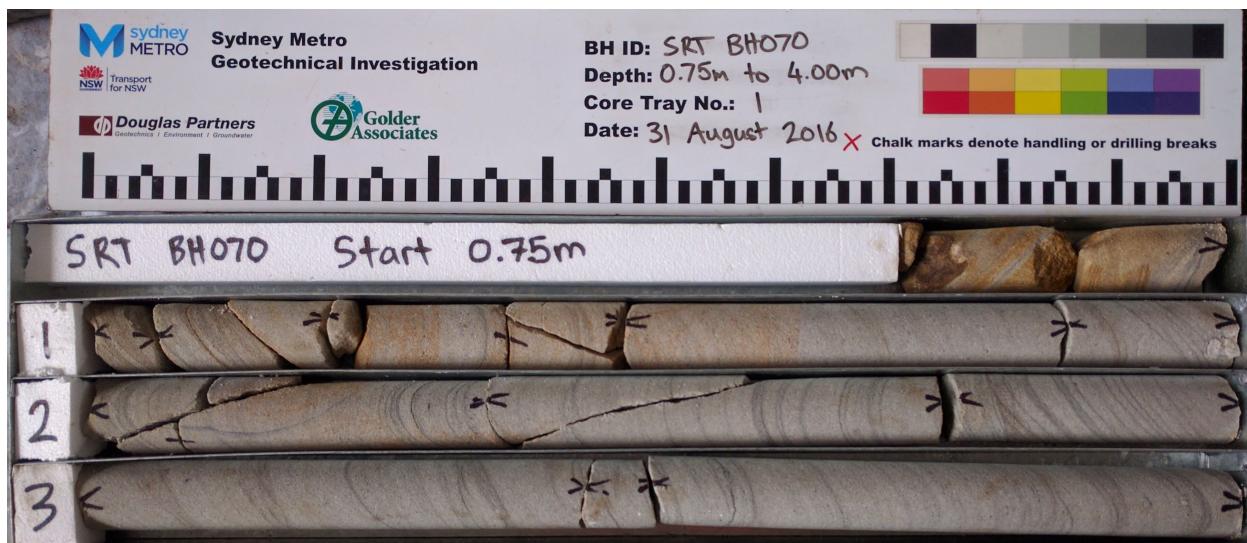
CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 2 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 3 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB

DATE: 27/9/16



This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

 GAP gINT FN. F28
 RL1



CLIENT: Transport for NSW
PROJECT: Sydney Metro City West Line
LOCATION: Barangaroo - Cross River Tunnel
PROJECT NoPCS 00013/1070



SRT BH070
13 REV: C
Color
Groundtest
/MB DATE: 9/9/16
DATE: 27/9/16



This report of core photographs must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

GAP gINT FN. F28
RL1

CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 5 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

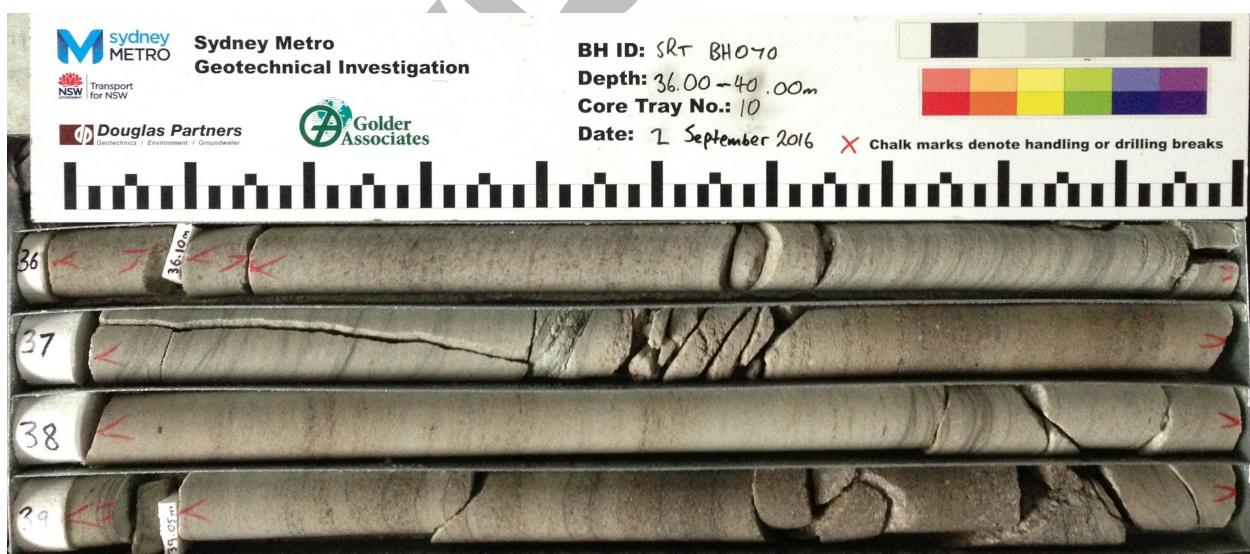
HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



A.S.I.O.



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 6 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 7 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 8 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

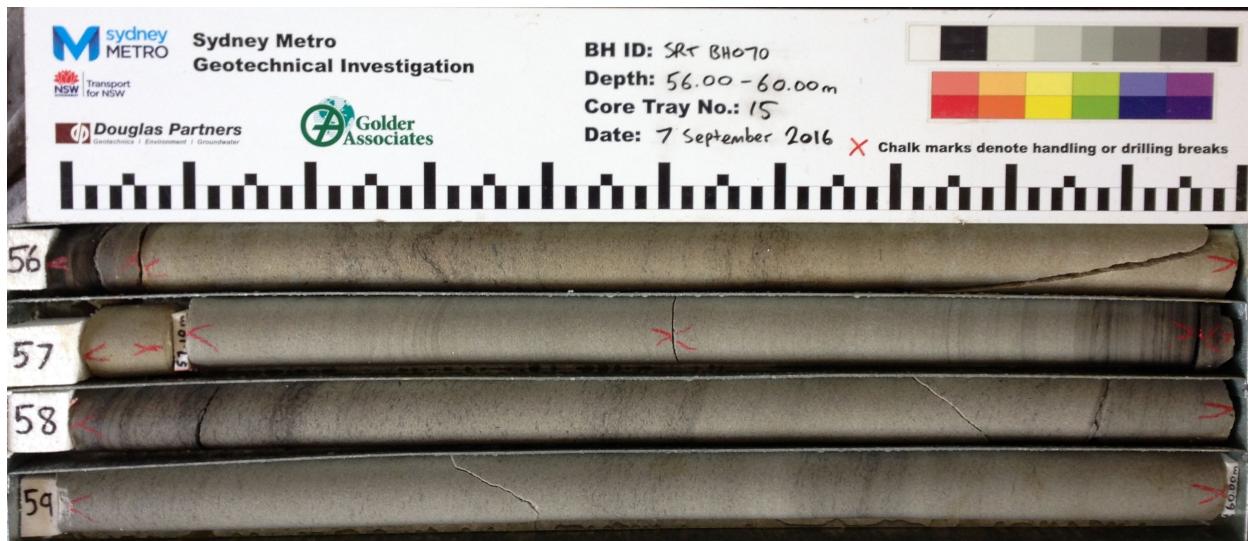
CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 9 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 10 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB

DATE: 27/9/16



ASIO!



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 11 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 12 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB

DATE: 27/9/16



CORE PHOTOGRAPHS: SRT BH070

CLIENT: Transport for NSW

COORDS: 333718.3 m E 6252110.3 m N MGA94 56

SHEET: 13 OF 13 REV: C

PROJECT: Sydney Metro City and Southwest

SURFACE RL: 2.57 m DATUM: AHD

DRILL RIG: Explora

LOCATION: Barangaroo - Cross-Over Cavern

INCLINATION: -61° DIRECTION: 339°

CONTRACTOR: Groundtest

PROJECT NoPCS 00013/10701

HOLE DEPTH: 100.00 m

LOGGED: LJH / MB DATE: 9/9/16

CHECKED: HB DATE: 27/9/16



REVISION!

Client : Transport for NSW
Project : Sydney Metro City and Southwest
Location : Barangaroo

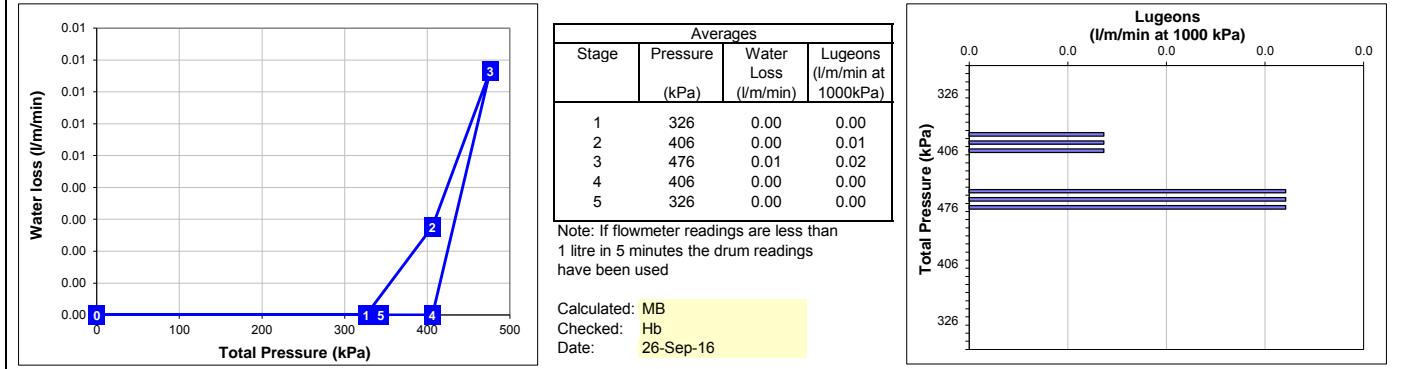
Project No. : 1650773
Bore : SRT BH070
Test section : 25.1 m - 31.3 m

Test Details

Date: 1-Sep-16 Bottom of packer (m): 25.1 Height of pressure gauge (m): 1.0 Drum Area (m²):
 Bore diameter (mm): 96 Bore depth (m): 31.3 Vertical Depth to groundwater (m): 25.1 0.3
 Bore inclination (deg): 60 Section length (m): 6.1 (or depth to base of packer) (base of packer)

Hg = gauge pressure, HI = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-HI

| PRESSURE Hg (kPa) | HI (kPa) | Total (kPa) | Test Duration (min) | FLOW RATES | | | | | | | | Water Loss (l/m/min) | Lugeons (l/m/min at 1000 kPa) | Approx Permeability (m/sec) |
|-------------------------|-------------------|-------------------|---------------------------|---------------|----------------------|-----|---------------|-----|---|---------------------|------------------------------|----------------------------|-------------------------------------|-----------------------------------|
| | | | | Flowmeter | | | Drum readings | | | Leakage (litres) | Assigned Flow (litres) | | | |
| Initial (litres) | Final (litres) | Total (litres) | Initial (mm) | Final (mm) | Equivalent litres | | | | | | | | | |
| 70 | 0 | 326 | 5 | 11.2 | 11.8 | 0.6 | 140 | 142 | 1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 70 | 0 | 326 | 5 | 11.8 | 12.4 | 0.6 | 142.0 | 144 | 1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 70 | 0 | 326 | 5 | 12.4 | 13.0 | 0.6 | 144.0 | 146 | 1 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 150 | 0 | 406 | 5 | 12.4 | 12.4 | 0.0 | 146 | 152 | 2 | 1.5 | 0.1 | 0.0 | 0.0 | 6.8E-10 |
| 150 | 0 | 406 | 5 | 12.4 | 12.4 | 0.0 | 152.0 | 158 | 2 | 1.5 | 0.1 | 0.0 | 0.0 | 6.8E-10 |
| 150 | 0 | 406 | 5 | 12.4 | 12.4 | 0.0 | 158.0 | 164 | 2 | 1.5 | 0.1 | 0.0 | 0.0 | 6.8E-10 |
| 220 | 0 | 476 | 5 | 12.4 | 12.9 | 0.5 | 164 | 173 | 2 | 2.1 | 0.2 | 0.0 | 0.0 | 1.6E-09 |
| 220 | 0 | 476 | 5 | 12.9 | 13.3 | 0.4 | 173.0 | 182 | 2 | 2.1 | 0.2 | 0.0 | 0.0 | 1.6E-09 |
| 220 | 0 | 476 | 5 | 13.3 | 13.7 | 0.4 | 182.0 | 191 | 2 | 2.1 | 0.2 | 0.0 | 0.0 | 1.6E-09 |
| 150 | 0 | 406 | 5 | 13.7 | 13.7 | 0.0 | 191 | 193 | 1 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 150 | 0 | 406 | 5 | 13.7 | 13.7 | 0.0 | 193.0 | 195 | 1 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 150 | 0 | 406 | 5 | 13.7 | 13.7 | 0.0 | 195.0 | 197 | 1 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 70 | 0 | 326 | 5 | 13.7 | 13.7 | 0.0 | 197 | 198 | 0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 70 | 0 | 326 | 5 | 13.7 | 13.7 | 0.0 | 198.0 | 199 | 0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |
| 70 | 0 | 326 | 5 | 13.7 | 13.7 | 0.0 | 199.0 | 200 | 0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0E+00 |

Notes


Client : Transport for NSW
Project : Sydney Metro City and Southwest
Location : Barangaroo

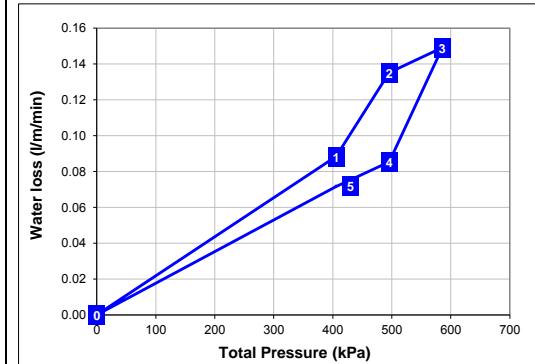
Project No. : 1650773
Bore : SRT BH070
Test section : 31.2 m - 36.5 m

Test Details

Date: 2-Sep-16 Bottom of packer (m): 31.2 Height of pressure gauge (m): 1.0 Drum Area (m²):
 Bore diameter (mm): 96 Bore depth (m): 36.5 Vertical Depth to groundwater (m): 31.2 0.3
 Bore inclination (deg): 60 Section length (m): 5.3 (or depth to base of packer) (base of packer)

Hg = gauge pressure, HI = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-HI

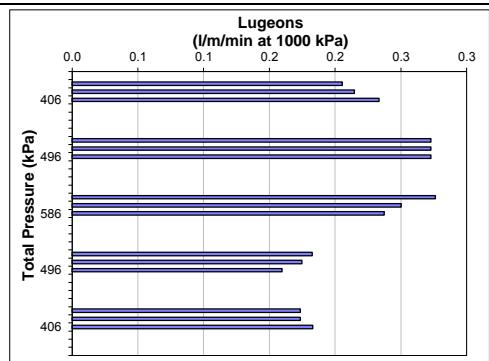
| PRESSURE Hg (kPa) | HI (kPa) | Total (kPa) | Test Duration (min) | FLOW RATES | | | | | | | | Water Loss (l/m/min) | Lugeons (l/m/min at 1000 kPa) | Approx Permeability (m/sec) |
|-------------------------|-------------------|-------------------|---------------------------|---------------|----------------------|---------------|-------|-----|---------------------|------------------------------|-----|----------------------------|-------------------------------------|-----------------------------------|
| | | | | Flowmeter | | Drum readings | | | Leakage (litres) | Assigned Flow (litres) | | | | |
| Initial (litres) | Final (litres) | Total (litres) | Initial (mm) | Final (mm) | Equivalent litres | | | | | | | | | |
| 90 | 0 | 406 | 5 | 172.0 | 175.2 | 3.2 | 215 | 228 | 3 | 1.0 | 2.2 | 0.1 | 0.2 | 2.1E-08 |
| 90 | 0 | 406 | 5 | 175.2 | 178.5 | 3.3 | 227.5 | 240 | 3 | 1.0 | 2.3 | 0.1 | 0.2 | 2.1E-08 |
| 90 | 0 | 406 | 5 | 178.5 | 182.0 | 3.5 | 240.0 | 252 | 3 | 1.0 | 2.5 | 0.1 | 0.2 | 2.3E-08 |
| 180 | 0 | 496 | 5 | 182.0 | 187.0 | 5.0 | 252 | 272 | 5 | 1.4 | 3.6 | 0.1 | 0.3 | 2.7E-08 |
| 180 | 0 | 496 | 5 | 187.0 | 192.0 | 5.0 | 272.0 | 292 | 5 | 1.4 | 3.6 | 0.1 | 0.3 | 2.7E-08 |
| 180 | 0 | 496 | 5 | 192.0 | 197.0 | 5.0 | 292.0 | 312 | 5 | 1.4 | 3.6 | 0.1 | 0.3 | 2.7E-08 |
| 270 | 0 | 586 | 5 | 197.0 | 204.0 | 7.0 | 312 | 340 | 7 | 2.7 | 4.3 | 0.2 | 0.3 | 2.8E-08 |
| 270 | 0 | 586 | 5 | 204.0 | 210.6 | 6.6 | 340.0 | 370 | 8 | 2.7 | 3.9 | 0.1 | 0.3 | 2.5E-08 |
| 270 | 0 | 586 | 5 | 210.6 | 217.0 | 6.4 | 370.0 | 392 | 6 | 2.7 | 3.7 | 0.1 | 0.2 | 2.4E-08 |
| 180 | 0 | 496 | 5 | 217.0 | 221.8 | 4.8 | 392 | 405 | 3 | 2.4 | 2.4 | 0.1 | 0.2 | 1.8E-08 |
| 180 | 0 | 496 | 5 | 221.8 | 226.5 | 4.7 | 405.0 | 425 | 5 | 2.4 | 2.3 | 0.1 | 0.2 | 1.7E-08 |
| 180 | 0 | 496 | 5 | 226.5 | 231.0 | 4.5 | 425.0 | 450 | 7 | 2.4 | 2.1 | 0.1 | 0.2 | 1.6E-08 |
| 90 | 0 | 406 | 5 | 231.0 | 234.3 | 3.3 | 450 | 458 | 2 | 1.4 | 1.9 | 0.1 | 0.2 | 1.7E-08 |
| 90 | 0 | 406 | 5 | 234.3 | 237.6 | 3.3 | 458.0 | 470 | 3 | 1.4 | 1.9 | 0.1 | 0.2 | 1.7E-08 |
| 90 | 0 | 406 | 5 | 237.6 | 241.0 | 3.4 | 470.0 | 485 | 4 | 1.4 | 2.0 | 0.1 | 0.2 | 1.8E-08 |

Notes


| Averages | | | |
|----------|-------------------|----------------------------|------------------------------------|
| Stage | Pressure (kPa) | Water Loss (l/m/min) | Lugeons (l/m/min at 1000kPa) |
| 1 | 406 | 0.09 | 0.22 |
| 2 | 496 | 0.14 | 0.27 |
| 3 | 586 | 0.15 | 0.25 |
| 4 | 496 | 0.09 | 0.17 |
| 5 | 406 | 0.07 | 0.18 |

Note: If flowmeter readings are less than 1 litre in 5 minutes the drum readings have been used

Calculated: MB
 Checked: HB
 Date: 26-Sep-16



Client : Transport for NSW
Project : Sydney Metro City and Southwest
Location : Barangaroo

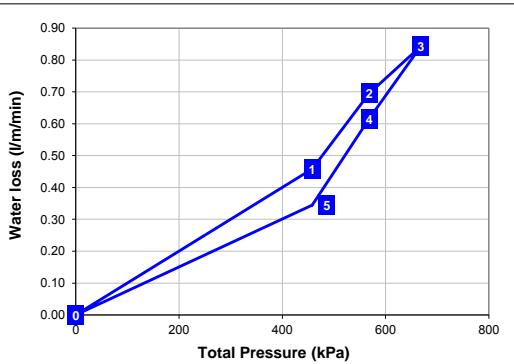
Project No. : 1650773
Bore : SRT BH070
Test section : 35.5 m - 41.5 m

Test Details

Date: 2-Sep-16 Bottom of packer (m): 35.5 Height of pressure gauge (m): 1.0 Drum Area (m²):
 Bore diameter (mm): 96 Bore depth (m): 41.5 Vertical Depth to groundwater (m): 35.5 0.3
 Bore inclination (deg): 60 Section length (m): 6.0 (or depth to base of packer) (base of packer)

Hg = gauge pressure, HI = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-HI

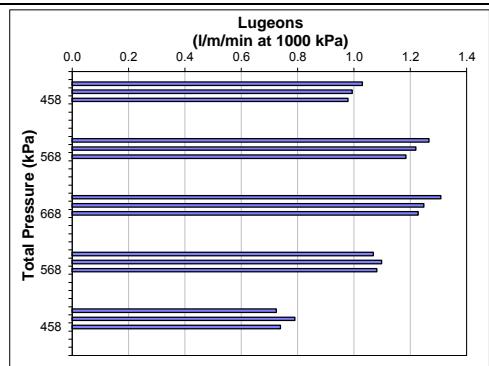
| PRESSURE Hg (kPa) | HI (kPa) | Total (kPa) | Test Duration (min) | FLOW RATES | | | | | | | | Water Loss (l/m/min) | Lugeons (l/m/min at 1000 kPa) | Approx Permeability (m/sec) |
|-------------------------|-------------------|-------------------|---------------------------|---------------|----------------------|---------------|-------|-----|---------------------|------------------------------|------|----------------------------|-------------------------------------|-----------------------------------|
| | | | | Flowmeter | | Drum readings | | | Leakage (litres) | Assigned Flow (litres) | | | | |
| Initial (litres) | Final (litres) | Total (litres) | Initial (mm) | Final (mm) | Equivalent litres | | | | | | | | | |
| 100 | 0 | 458 | 5 | 290.0 | 305.0 | 15.0 | 150 | 215 | 17 | 0.9 | 14.1 | 0.5 | 1.0 | 1.0E-07 |
| 100 | 0 | 458 | 5 | 305.0 | 319.5 | 14.5 | 215.0 | 265 | 13 | 0.9 | 13.6 | 0.5 | 1.0 | 9.9E-08 |
| 100 | 0 | 458 | 5 | 319.5 | 333.8 | 14.3 | 265.0 | 312 | 12 | 0.9 | 13.4 | 0.4 | 1.0 | 9.8E-08 |
| 210 | 0 | 568 | 5 | 333.8 | 357.2 | 23.4 | 312 | 412 | 26 | 1.9 | 21.5 | 0.7 | 1.3 | 1.3E-07 |
| 210 | 0 | 568 | 5 | 357.2 | 379.8 | 22.6 | 412.0 | 508 | 25 | 1.9 | 20.7 | 0.7 | 1.2 | 1.2E-07 |
| 210 | 0 | 568 | 5 | 379.8 | 401.8 | 22.0 | 508.0 | 599 | 24 | 1.9 | 20.1 | 0.7 | 1.2 | 1.2E-07 |
| 310 | 0 | 668 | 5 | 401.8 | 430.0 | 28.2 | 98 | 204 | 28 | 2.1 | 26.1 | 0.9 | 1.3 | 1.3E-07 |
| 310 | 0 | 668 | 5 | 430.0 | 457.0 | 27.0 | 204.0 | 314 | 29 | 2.1 | 24.9 | 0.8 | 1.2 | 1.2E-07 |
| 310 | 0 | 668 | 5 | 457.0 | 483.6 | 26.6 | 314.0 | 420 | 28 | 2.1 | 24.5 | 0.8 | 1.2 | 1.2E-07 |
| 210 | 0 | 568 | 5 | 483.6 | 503.3 | 19.7 | 420 | 495 | 20 | 1.5 | 18.2 | 0.6 | 1.1 | 1.1E-07 |
| 210 | 0 | 568 | 5 | 503.3 | 523.5 | 20.2 | 495.0 | 560 | 17 | 1.5 | 18.7 | 0.6 | 1.1 | 1.1E-07 |
| 210 | 0 | 568 | 5 | 523.5 | 543.4 | 19.9 | 560.0 | 630 | 18 | 1.5 | 18.4 | 0.6 | 1.1 | 1.1E-07 |
| 100 | 0 | 458 | 5 | 543.4 | 554.2 | 10.8 | 96 | 138 | 11 | 0.9 | 9.9 | 0.3 | 0.7 | 7.3E-08 |
| 100 | 0 | 458 | 5 | 554.2 | 565.9 | 11.7 | 138.0 | 175 | 10 | 0.9 | 10.8 | 0.4 | 0.8 | 7.9E-08 |
| 100 | 0 | 458 | 5 | 565.9 | 576.9 | 11.0 | 175.0 | 221 | 12 | 0.9 | 10.1 | 0.3 | 0.7 | 7.4E-08 |

Notes


| Averages | | | |
|----------|-------------------|----------------------------|-------------------------------------|
| Stage | Pressure (kPa) | Water Loss (l/m/min) | Lugeons (l/m/min at 1000 kPa) |
| 1 | 458 | 0.46 | 1.00 |
| 2 | 568 | 0.70 | 1.22 |
| 3 | 668 | 0.84 | 1.26 |
| 4 | 568 | 0.62 | 1.08 |
| 5 | 458 | 0.34 | 0.75 |

Note: If flowmeter readings are less than 1 litre in 5 minutes the drum readings have been used

Calculated: MB
 Checked: HB
 Date: 26-Sep-16



Client : Transport for NSW
Project : Sydney Metro City and Southwest
Location : Barangaroo

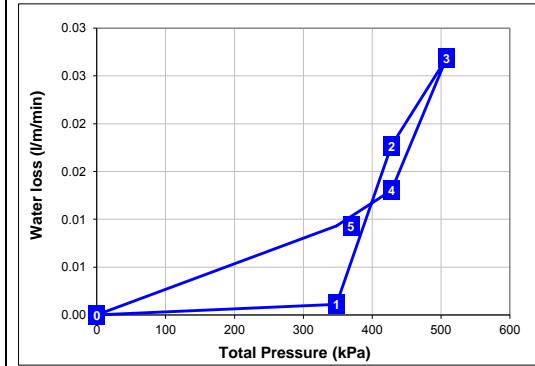
Project No. : 1650773
Bore : SRT BH071
Test section : 26.85 m - 32.85 m

Test Details

Date: 29-Aug-16 Bottom of packer (m): 26.9 Height of pressure gauge (m): 0.5 Drum Area (m^2):
 Bore diameter (mm): 96 Bore depth (m): 32.9 Vertical Depth to groundwater (m): 26.9 0.3
 Bore inclination (deg): 90 Section length (m): 6.0 (or depth to base of packer) (base of packer)

Hg = gauge pressure, HI = head loss in rods and packer, Hw = (gauge height + groundwater depth)x 9.81, Total = Hg+Hw-HI

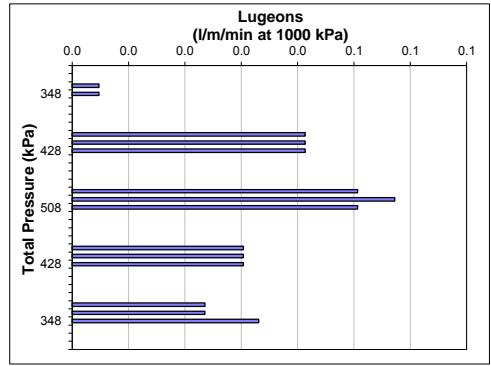
| PRESSURE Hg (kPa) | HI (kPa) | Total (kPa) | Test Duration (min) | FLOW RATES | | | | | | | | Water Loss (l/m/min) | Lugeons (l/m/min at 1000 kPa) | Approx Permeability (m/sec) | |
|-------------------------|-------------|----------------|---------------------------|------------|-------|-----|---------------|-----|---|---------------------|------------------------------|----------------------------|-------------------------------------|-----------------------------------|--|
| | | | | Flowmeter | | | Drum readings | | | Leakage (litres) | Assigned Flow (litres) | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 80 | 0 | 348 | 5 | 168.5 | 169.7 | 1.2 | 70 | 79 | 2 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0E+00 | |
| 80 | 0 | 348 | 5 | 169.7 | 171.0 | 1.3 | 79.0 | 83 | 1 | 1.3 | 0.1 | 0.0 | 0.0 | 4.8E-10 | |
| 80 | 0 | 348 | 5 | 171.0 | 172.3 | 1.3 | 83.0 | 86 | 1 | 1.3 | 0.1 | 0.0 | 0.0 | 4.8E-10 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 160 | 0 | 428 | 5 | 172.3 | 174.9 | 2.6 | 86 | 94 | 2 | 2.1 | 0.5 | 0.0 | 0.0 | 4.1E-09 | |
| 160 | 0 | 428 | 5 | 174.9 | 177.5 | 2.6 | 94.0 | 105 | 3 | 2.1 | 0.5 | 0.0 | 0.0 | 4.1E-09 | |
| 160 | 0 | 428 | 5 | 177.5 | 180.1 | 2.6 | 105.0 | 115 | 3 | 2.1 | 0.5 | 0.0 | 0.0 | 4.1E-09 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 240 | 0 | 508 | 5 | 180.1 | 183.6 | 3.5 | 115 | 125 | 3 | 2.7 | 0.8 | 0.0 | 0.1 | 5.1E-09 | |
| 240 | 0 | 508 | 5 | 183.6 | 187.2 | 3.6 | 125.0 | 136 | 3 | 2.7 | 0.9 | 0.0 | 0.1 | 5.7E-09 | |
| 240 | 0 | 508 | 5 | 187.2 | 190.7 | 3.5 | 136.0 | 147 | 3 | 2.7 | 0.8 | 0.0 | 0.1 | 5.1E-09 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 160 | 0 | 428 | 5 | 190.7 | 193.2 | 2.5 | 147 | 154 | 2 | 2.1 | 0.4 | 0.0 | 0.0 | 3.0E-09 | |
| 160 | 0 | 428 | 5 | 193.2 | 195.7 | 2.5 | 154.0 | 163 | 2 | 2.1 | 0.4 | 0.0 | 0.0 | 3.0E-09 | |
| 160 | 0 | 428 | 5 | 195.7 | 198.2 | 2.5 | 163.0 | 171 | 2 | 2.1 | 0.4 | 0.0 | 0.0 | 3.0E-09 | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| 80 | 0 | 348 | 5 | 198.2 | 199.6 | 1.4 | 171 | 178 | 2 | 1.2 | 0.2 | 0.0 | 0.0 | 2.4E-09 | |
| 80 | 0 | 348 | 5 | 199.6 | 201.0 | 1.4 | 178.0 | 181 | 1 | 1.2 | 0.2 | 0.0 | 0.0 | 2.4E-09 | |
| 80 | 0 | 348 | 5 | 201.0 | 202.5 | 1.5 | 181.0 | 185 | 1 | 1.2 | 0.3 | 0.0 | 0.0 | 3.3E-09 | |

Notes


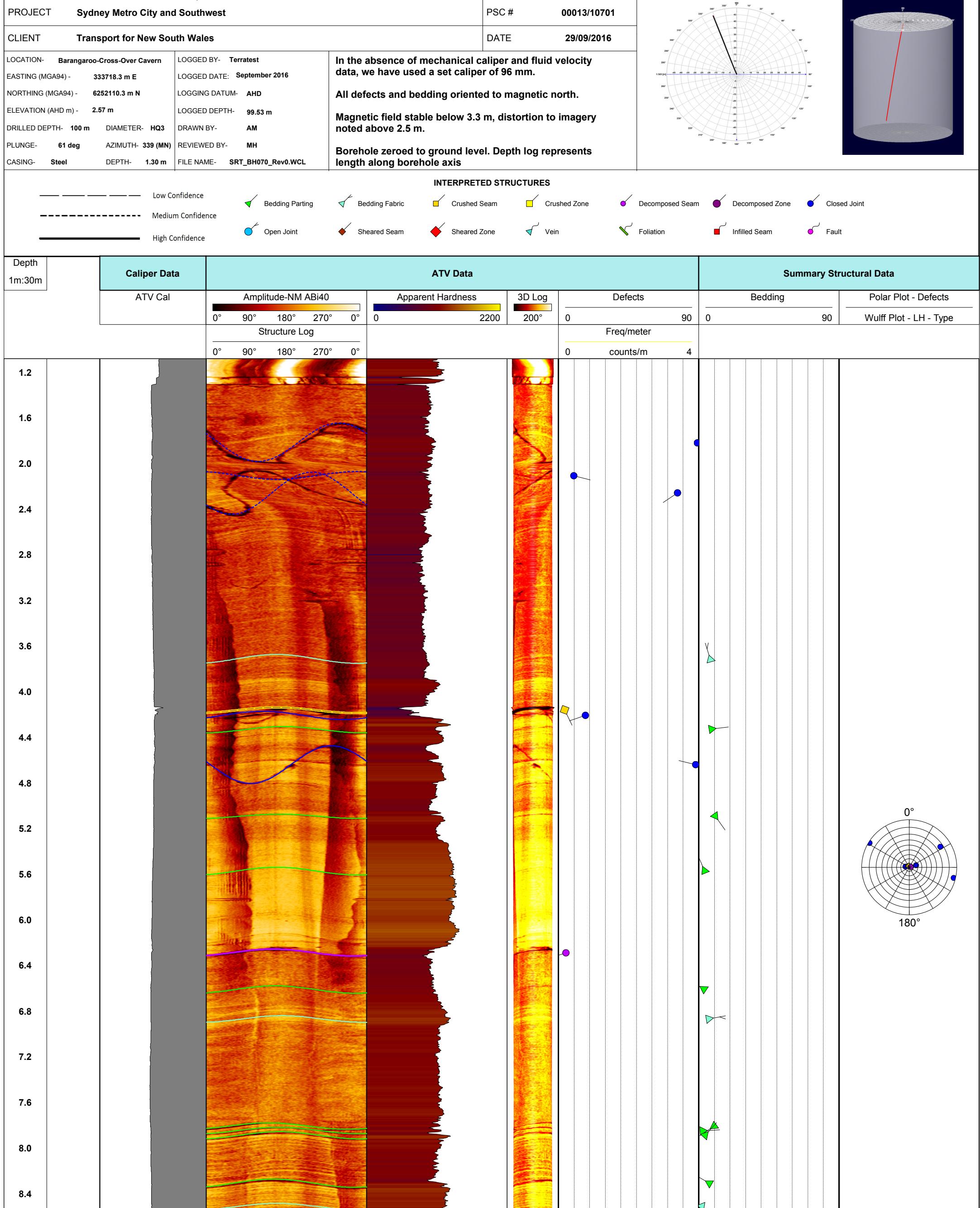
| Averages | | | |
|----------|-------------------|----------------------------|------------------------------------|
| Stage | Pressure (kPa) | Water Loss (l/m/min) | Lugeons (l/m/min at 1000kPa) |
| 1 | 348 | 0.00 | 0.00 |
| 2 | 428 | 0.02 | 0.04 |
| 3 | 508 | 0.03 | 0.05 |
| 4 | 428 | 0.01 | 0.03 |
| 5 | 348 | 0.01 | 0.03 |

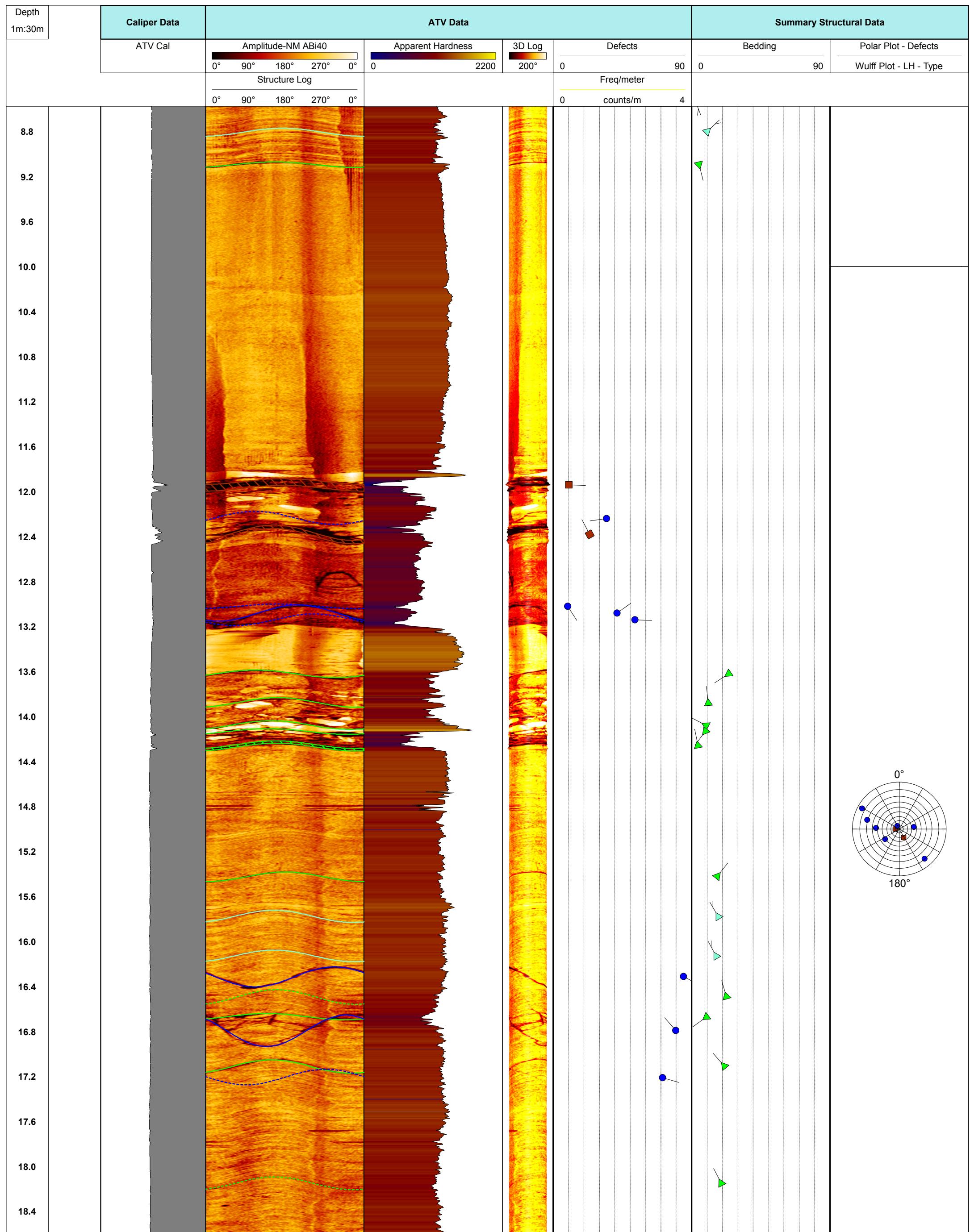
Note: If flowmeter readings are less than 1 litre in 5 minutes the drum readings have been used

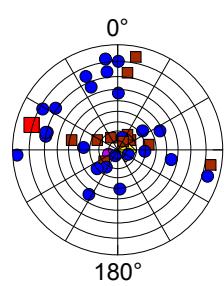
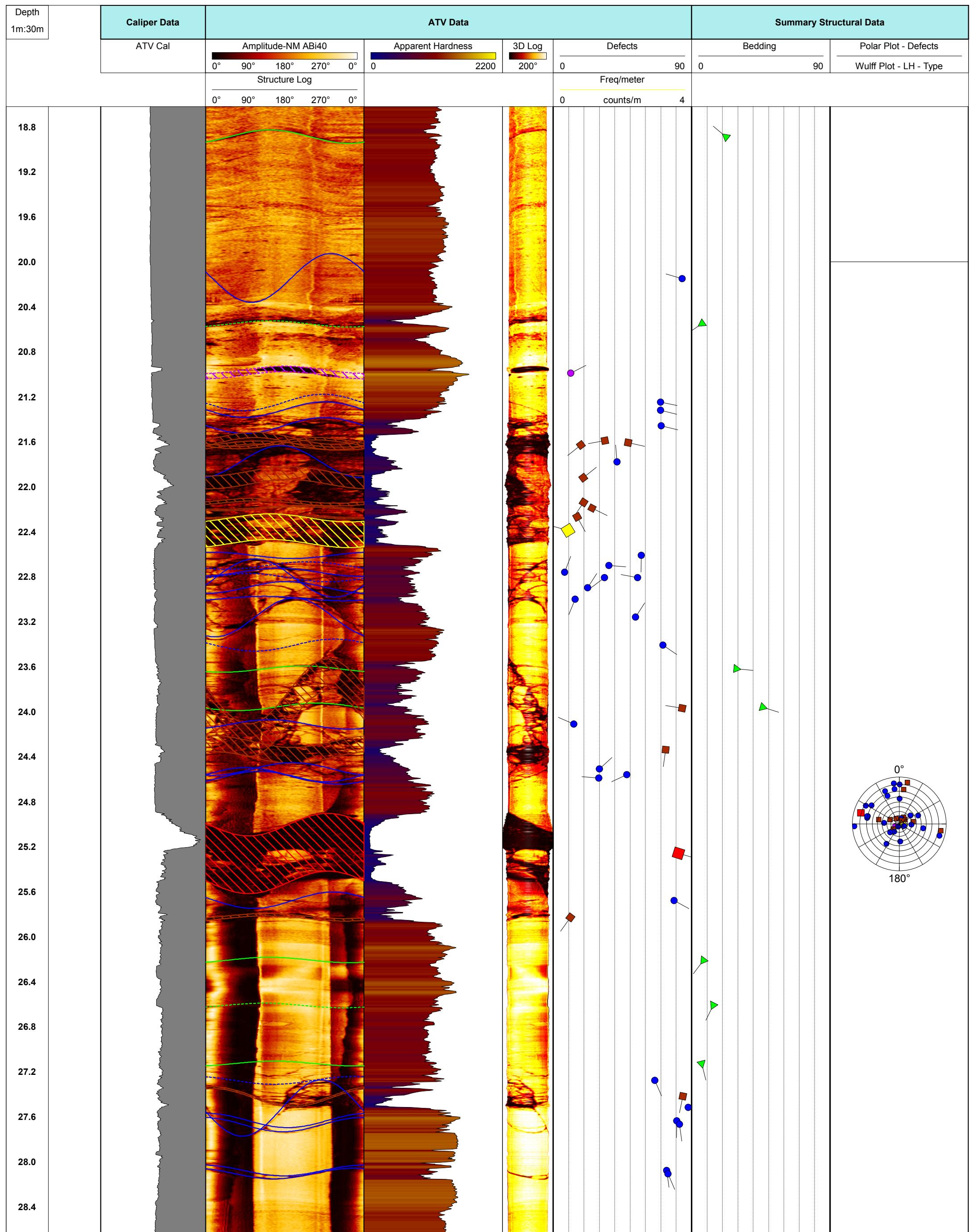
Calculated: MB
Checked: HB
Date: 5-Sep-16

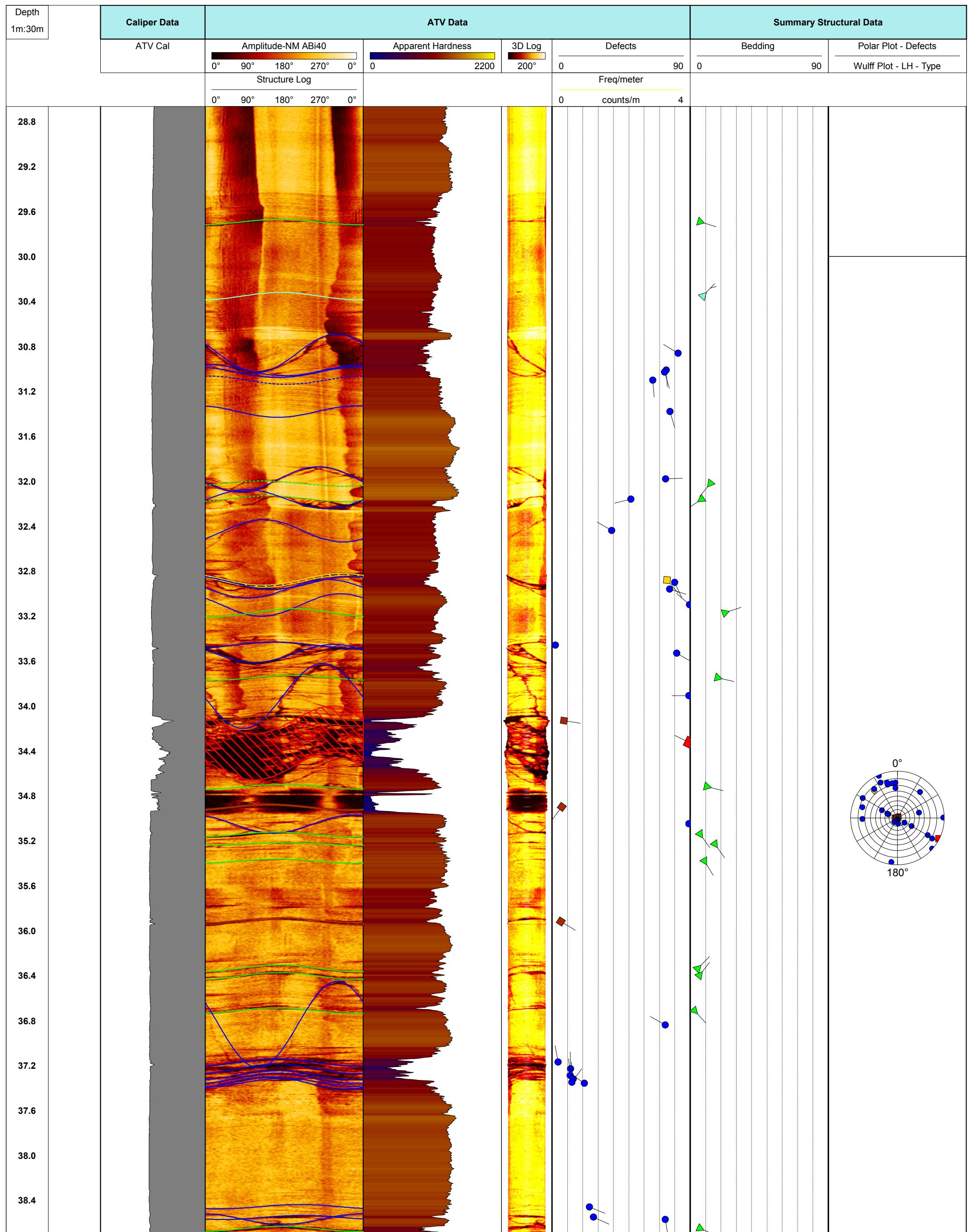


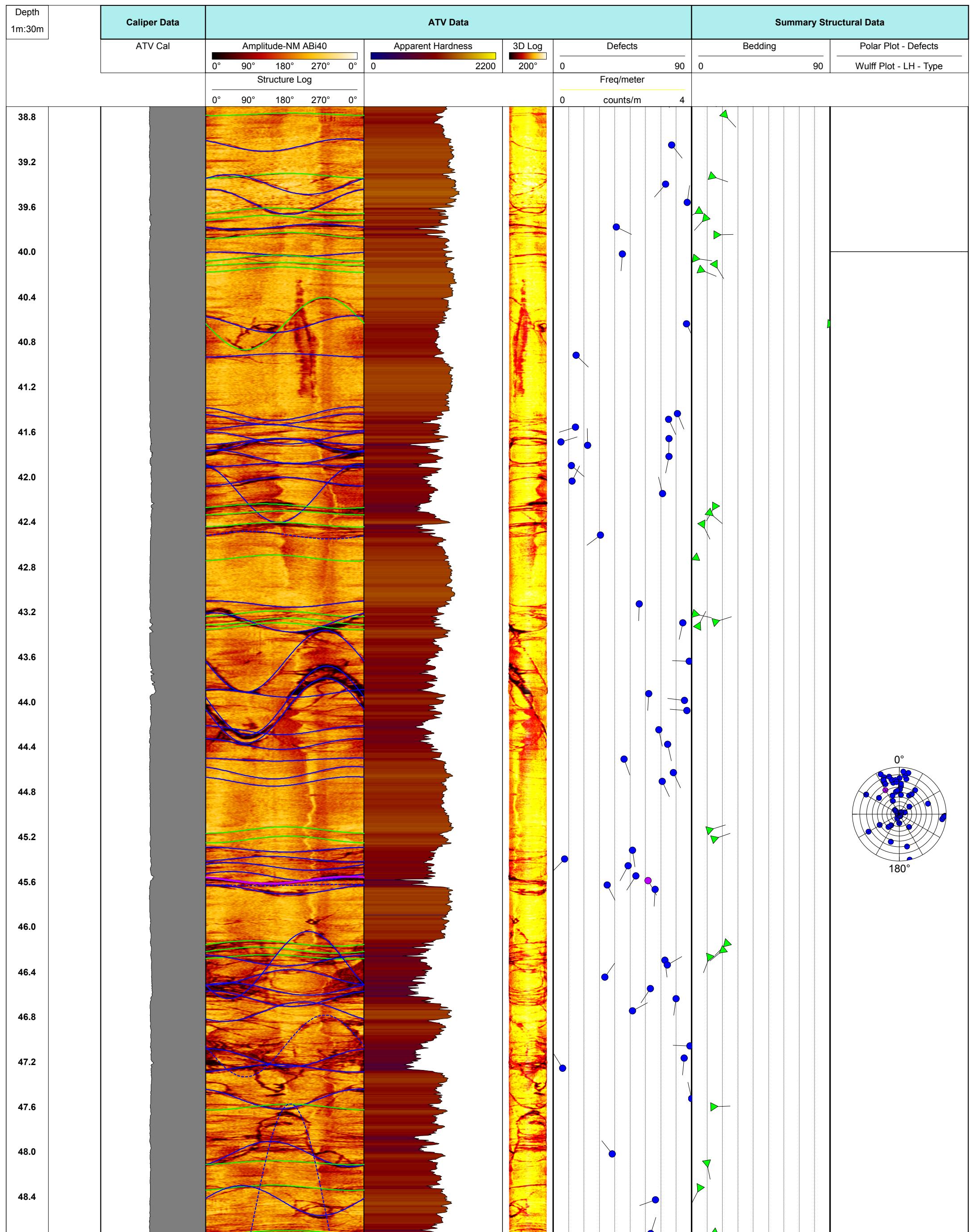
GEOPHYSICAL RECORD OF BOREHOLE: SRT BH070

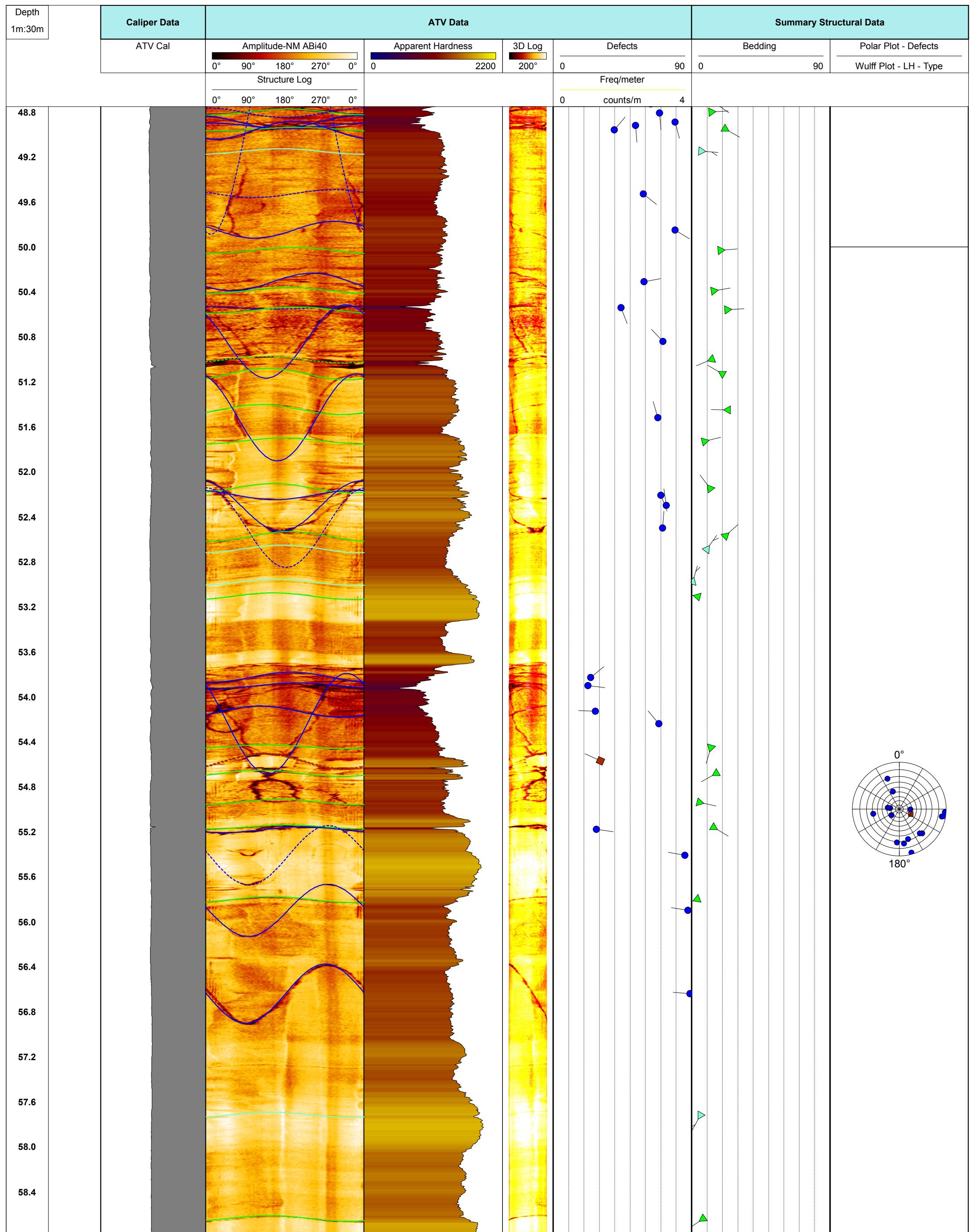


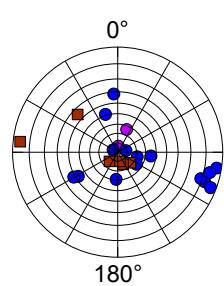
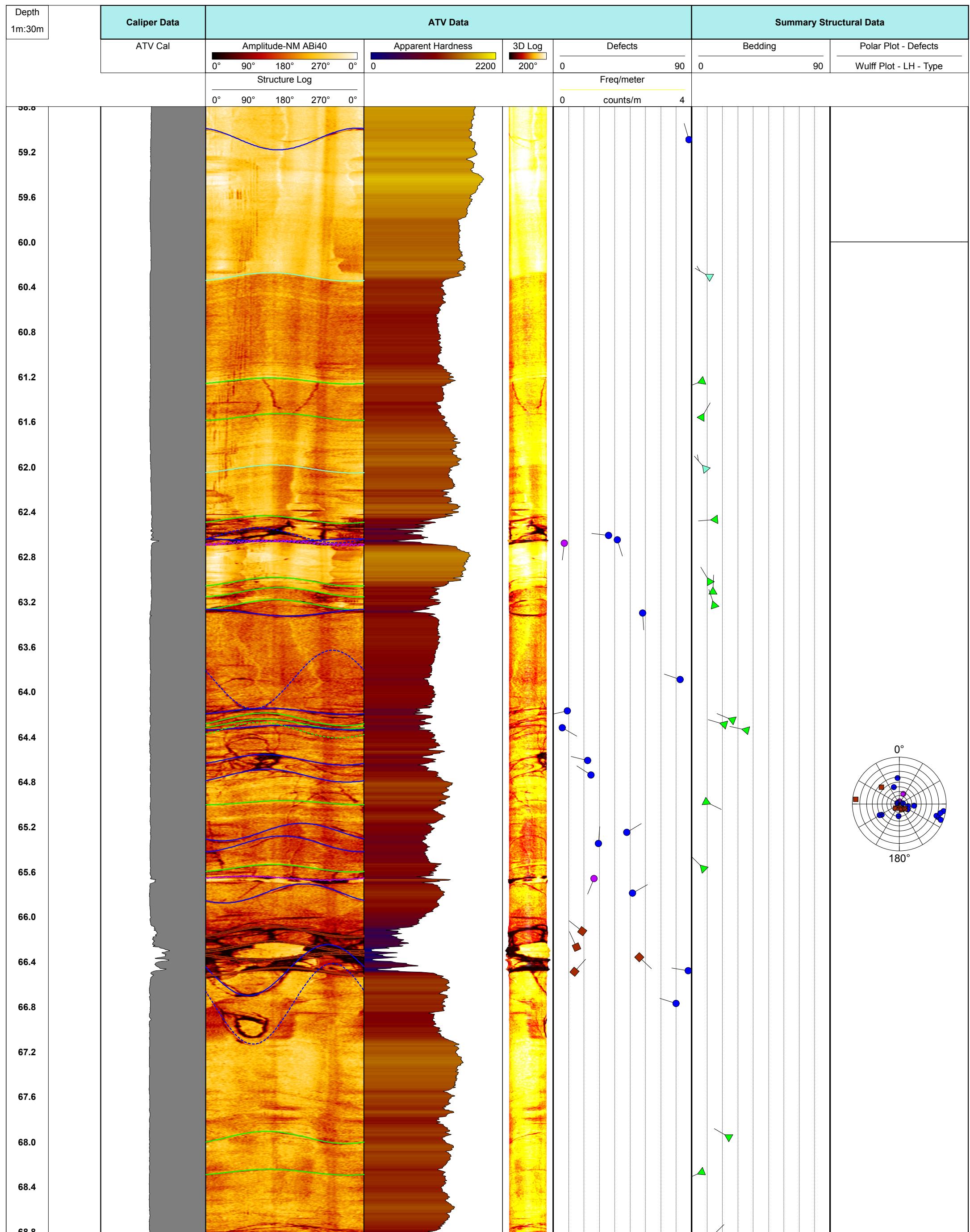


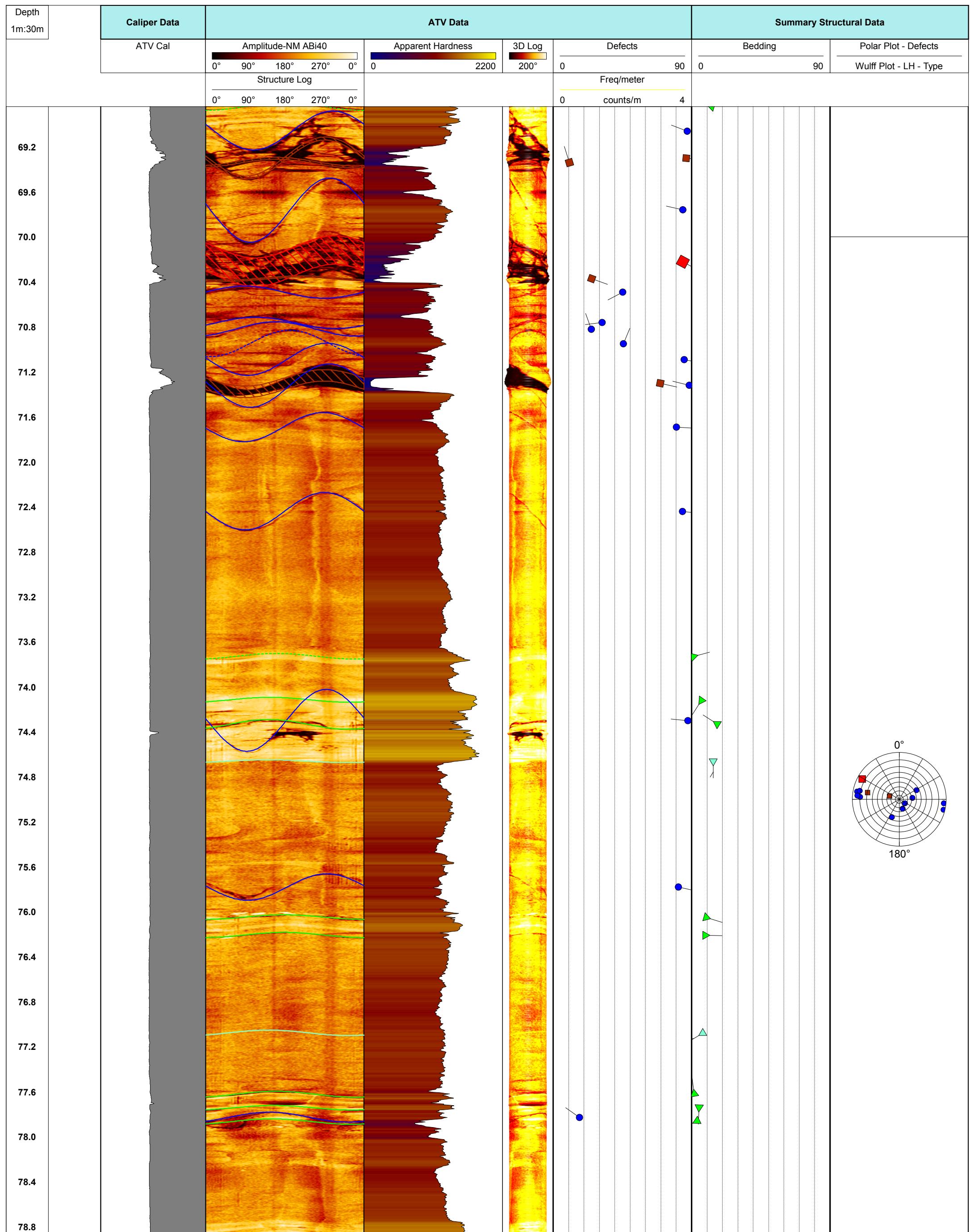


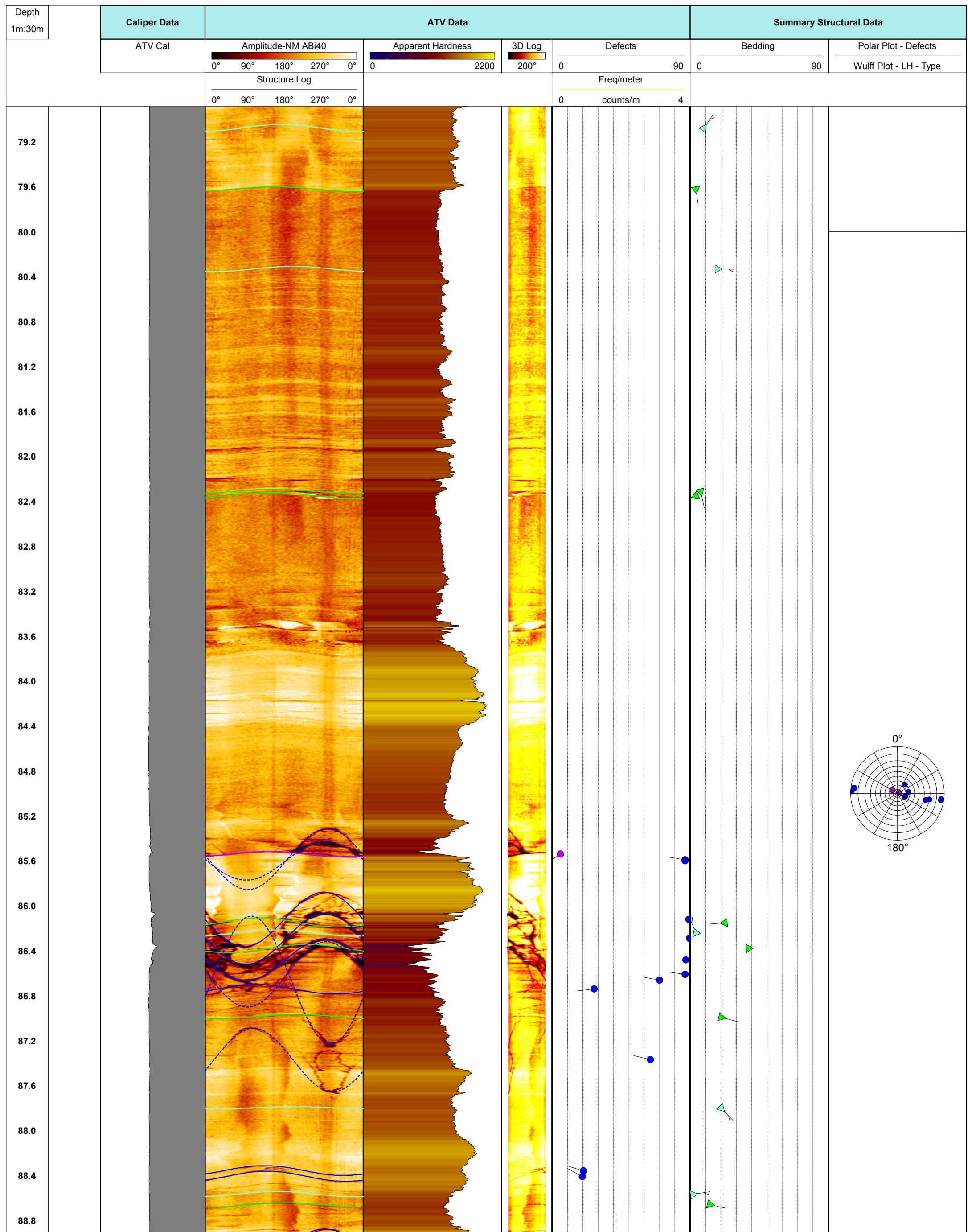


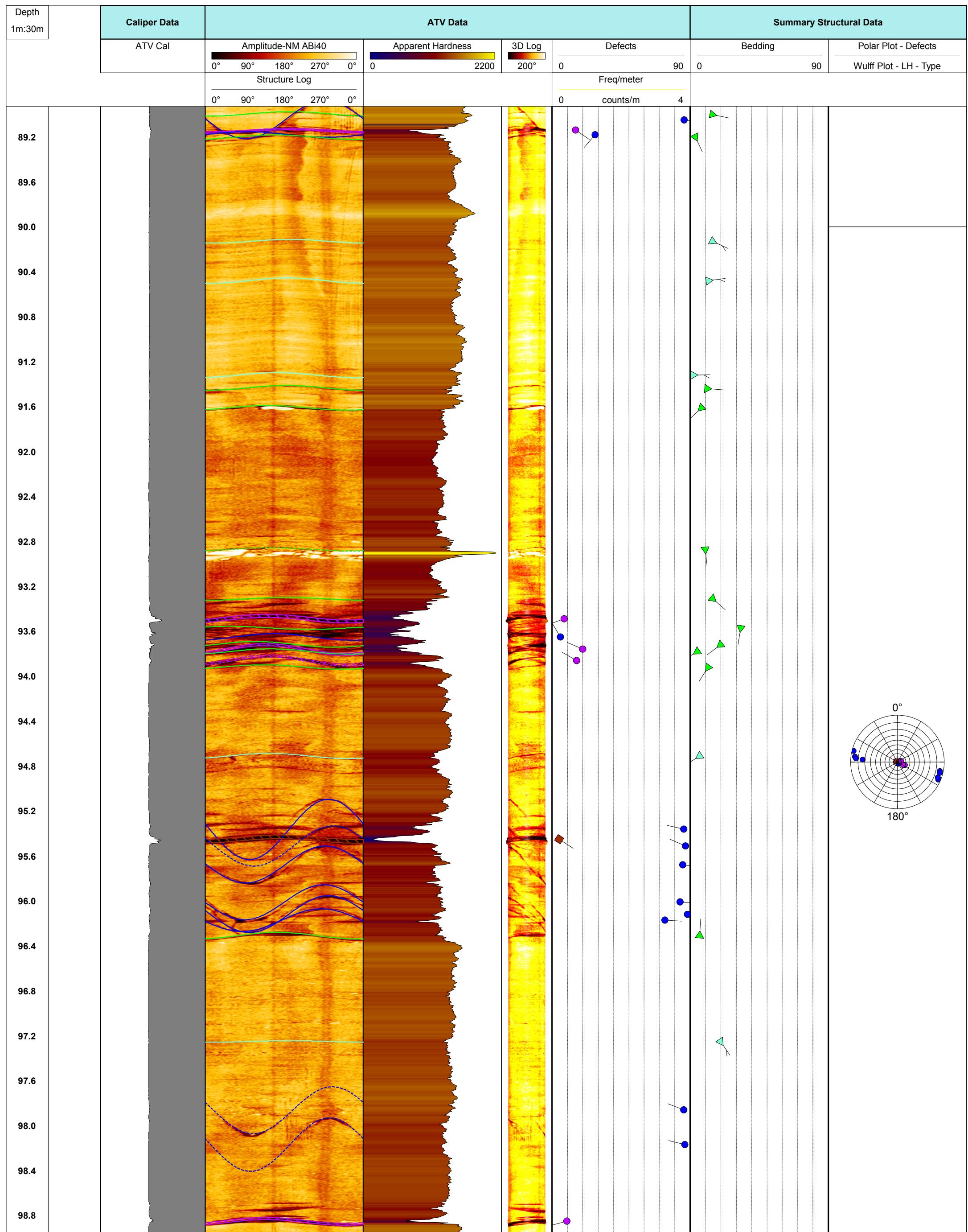


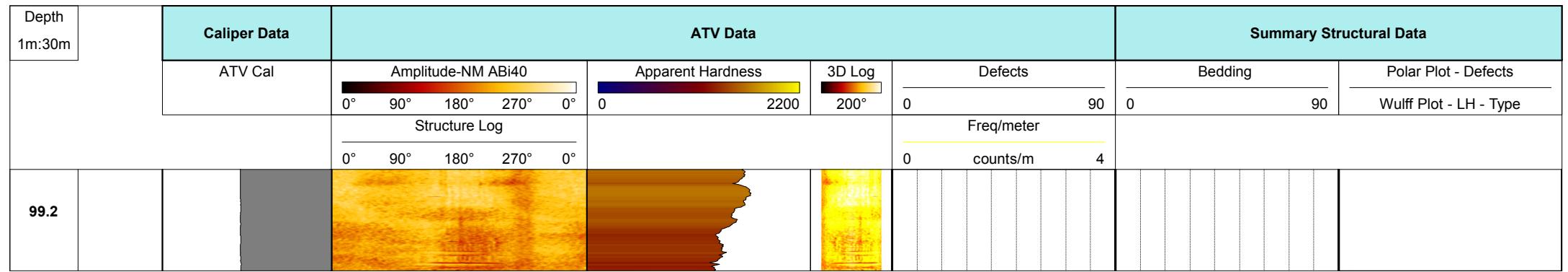














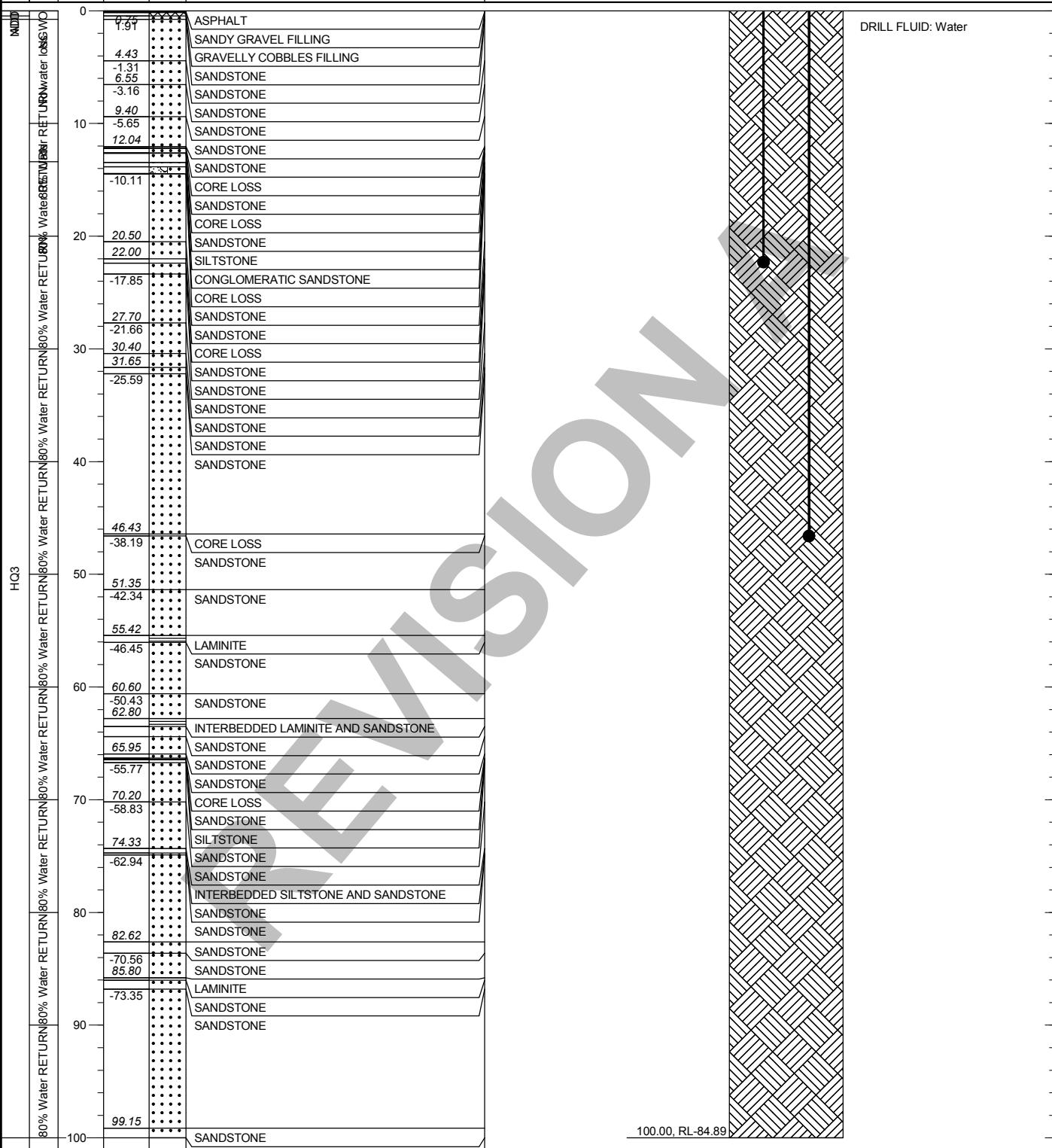
REVISION A STANDPIPE INSTALLATION: SRT BH070

CLIENT: Transport for New South Wales
PROJECT: Sydney Metro City and Southwest
LOCATION: Barangaroo - Cross-Over Cavern
PROJECT No1650773

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
SURFACE RL: 2.57 m DATUM: AHD
INCLINATION: -61° DIRECTION: 339°
HOLE DEPTH: 100.00 m

SHEET: 1 OF 2 REV: A
DRILL RIG: Explora
CONTRACTOR: Groundtest
LOGGED: LJH / MB DATE: 9/9/16
CHECKED: HB DATE: 27/9/16

| Drilling | | Field Material Description | | | Instrumentation Details | | | | |
|----------|-------|----------------------------|----------|-------------|--------------------------------|-----------------------|----------------|--------------|-------------------|
| Method | Water | Depth (metres) | Depth RL | Graphic Log | ID | Type | Tip Depth & RL | | Installation Date |
| | | | | | SN21053 | Electronic Piezometer | 22.30 m | -16.94 m AHD | 12/09/16 |
| | | | | | SN21054 | Electronic Piezometer | 46.60 m | -38.19 m AHD | 12/09/16 |
| | | | | | SN21055 | | | | |
| | | | | | SN21056 | | | | |
| | | | | | SOIL/ROCK MATERIAL DESCRIPTION | | | | |



This report of standpipe installation must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.



Douglas Partners
Geotechnics / Environment / Groundwater

REVISION A STANDPIPE INSTALLATION: SRT BH070

CLIENT: Transport for New South Wales
PROJECT: Sydney Metro City and Southwest
LOCATION: Barangaroo - Cross-Over Cavern
PROJECT No1650773

COORDS: 333718.3 m E 6252110.3 m N MGA94 56
SURFACE RL: 2.57 m DATUM: AHD
INCLINATION: -61° DIRECTION: 339°
HOLE DEPTH: 100.00 m

SHEET: 2 OF 2 REV: A
DRILL RIG: Explora
CONTRACTOR: Groundtest
LOGGED: LJH / MB DATE: 9/9/16
CHECKED: HB DATE: 27/9/16

| Drilling | | Field Material Description | | | Instrumentation Details | | | | |
|----------|-------|----------------------------|----------|-------------|--|---------|-----------------------|----------------------|--------------------|
| METHOD | WATER | DEPTH (metres) | DEPTH RL | GRAPHIC LOG | SOIL/ROCK MATERIAL DESCRIPTION | ID | Type | Tip Depth & RL | Installation Date |
| | | | | | END OF BOREHOLE @ 100.00 m TARGET DEPTH VWP installed (x2) | SN21053 | Electronic Piezometer | 22.30 m -16.94 m AHD | 12/09/16 |
| | | | | | | SN21054 | Electronic Piezometer | 46.60 m -38.19 m AHD | 12/09/16 |
| | | | | | | | | | DRILL FLUID: Water |
| | | 110 | | | | | | | |
| | | 120 | | | | | | | |
| | | 130 | | | | | | | |
| | | 140 | | | | | | | |
| | | 150 | | | | | | | |
| | | 160 | | | | | | | |
| | | 170 | | | | | | | |
| | | 180 | | | | | | | |
| | | 190 | | | | | | | |
| | | 200 | | | | | | | |

This report of standpipe installation must be read in conjunction with accompanying notes and abbreviations. It has been prepared for geotechnical purposes only, without attempt to assess possible contamination. Any references to potential contamination are for information only and do not necessarily indicate the presence or absence of soil or groundwater contamination.

GAP gINT FN. F17
RL1