

Appendix B

Borehole Logs



Borehole No. BH01

Project: Richmond South Reservoir
 Client: Tasman District Council
 Project No.: 5-G3104.09
 Location: Refer Location Plan
 520 Hill Street, Richmond

Coordinates: 1614404 E 5421094 N
 Ref. Grid: NZTM
 R.L.: Not established
 Datum:
 Depth: 10.15 m
 Inclination: 90°
 Azimuth: 0°

| GEOLOGY | MAIN DESCRIPTION / DETAIL DESCRIPTION | R.L. (m) | DEPTH (m) | GRAPHIC LOG | TESTS | | CORE | | DRILLING | | | NOTES / OTHER TESTS | INSTALLATION DETAILS | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|-------------|---------------|--------------------------------|--------------------|-------------------------|-----------------|--------|----------------------------|---------------------|---------------------------------------------------------------------------|------------------|------------------|
| | | | | | SPT 'N' VALUE | SPT BLOW COUNTS OR SHEAR VALUE | CORE TYPE | TOTAL CORE RECOVERY (%) | DRILLING METHOD | CASING | BASE OF HOLE & WATER LEVEL | | | | |
| TRENCH FILLS | Clayey SILT, some sand, trace of gravel; brown. Soft, wet, moderate plasticity. Gravel, fine; sand, fine. Organic soil with grass and fine rootlets. | | | | | | | | | | | | | | |
| | Medium to coarse GRAVEL; grey. Subrounded to angular. Black plastic liner and PVC pipe fragment. Lost core | | | | | | | PQ | 44 | | | | | | |
| MOUTERE GRAVELS | Gravelly SILT, some cobbles, some sand and some clay, grey. Soft to firm; wet; low plasticity. Cobbles maximum 80mm size. | | 1 | | | | | PQ | 100 | | | | | | |
| | Clayey COBBLES with some gravel, some sand and some silt, light orange brown. Dense; moist; well graded; gravel, medium to coarse; sand fine; silt and clay, plastic. Cobbles maximum 150mm size. | | | | | 44 | 12// 8/10/13/13 | PQ | 100 | | | | 1.09-1.10m - SWL 1.10m on 24/6/2020 (8am) at 9m depth SPT: Split spoon | | |
| | Lost core | | | | | | | PQ | 50 | | | | | | |
| | Clayey fine to coarse GRAVEL with some sand and some silt; light orange brown, indistinctly bedded. Very dense; moist. Some loss of fines in recovered sample from 2.70-3.00m. | | | 3 | | | | | PQ | 85 | | | | SPT: Split spoon | |
| | Lost core | | | | | | | | PQ | 85 | | | | | |
| | RUBBLE ZONE. Medium to coarse gravel. Few cobbles have been cored and recovered. Some clay and silt recovered at the base. | | | 4 | | | | | PQ | 80 | | | | | |
| | Lost core | | | | | | | | PQ | 100 | | | | | |
| | RUBBLE ZONE. Medium to coarse gravel with cobbles. Clayey fine to coarse GRAVEL with some sand, some silt, some cobbles and trace of boulders; light orange brown. Very dense; moist; well graded; subrounded to angular, slightly to moderately weathered sandstone gravel; sand, fine; silt and clay, low plasticity. Boulder at 4.20-4.30m estimated to 200mm size. | | | 5 | | | | | PQ | 100 | | | | | SPT: Split spoon |
| | Lost core | | | | | | | | PQ | 0 | | | | | |
| | RUBBLE ZONE. Medium to coarse gravel. | | | 6 | | | | | PQ | 100 | | | | | SPT: Split spoon |
| | Clayey fine to coarse GRAVEL with some sand, some silt, some cobbles and trace of boulders; light orange brown. Very dense; moist; well graded; subrounded to angular, slightly to moderately weathered sandstone gravel; sand, fine; silt and clay, low plasticity. Boulder at 7.80-7.90m estimated to 200mm size. | | | 7 | | | | | PQ | 100 | | | | | SPT: Split spoon |
| | Lost core | | | | | | | | PQ | 100 | | | | | |
| RUBBLE ZONE. Medium to coarse gravel with cobbles, subrounded to angular. Clayey fine to coarse GRAVEL with some sand, some silt and minor cobbles; light orange brown. Very dense; moist; well graded; subrounded to angular, slightly to moderately weathered sandstone gravel; sand, fine; silt and clay, low plasticity. | | | 8 | | | | | PQ | 67 | | | | | | |
| Lost core | | | | | | | | PQ | 100 | | | | | | |
| Gravelly COBBLES with some clay, some silt and some boulders; orange brown. Very dense; moist; poorly graded. Slightly weathered sandstone cobbles and boulders, strong. | | | 9 | | | | | PQ | 100 | | | | | SPT: Split spoon | |

Notes:
SPT hammer energy ratio 98%

Started: 22/06/2020
 Drilling Co.: CW Drilling
 Logged by: T Fischer

Finished: 24/06/2020
 Drilling Rig: Hanjan D8
 Checked by: H Hendrickson



Borehole No. BH01

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 Ref. Grid: NZTM
 R.L.: Not established
 Datum:
 Depth: 10.15 m
 Inclination: 90°
 Azimuth: 0°

| GEOLOGY | MAIN DESCRIPTION / DETAIL DESCRIPTION | R.L. (m) DEPTH (m) | GRAPHIC LOG | TESTS | | CORE | | DRILLING | | NOTES / OTHER TESTS | INSTALLATION DETAILS |
|---------|--------------------------------------------------|-----------------------|-------------|---------------|--------------------------------------|-----------|----------------------------|--------------------|--------|----------------------------------------------------------|-------------------------|
| | | | | SPT 'N' VALUE | SPT BLOW COUNTS OR SHEAR VALUE | CORE TYPE | TOTAL CORE RECOVERY (%) | DRILLING METHOD | CASING | | |
| | END OF BOREHOLE AT 10.15m - Target Depth Reached | | | >50 | 36/ 50 for 0mm | | | | | SPT: Solid nose. Double bounce at 3rd interval (>50). | |
| | | 11 | | | | | | | | | |
| | | 12 | | | | | | | | | |
| | | 13 | | | | | | | | | |
| | | 14 | | | | | | | | | |
| | | 15 | | | | | | | | | |
| | | 16 | | | | | | | | | |
| | | 17 | | | | | | | | | |
| | | 18 | | | | | | | | | |
| | | 19 | | | | | | | | | |

BOREHOLE SOIL LOG A4 - WSP_RICHMOND SOUTH RESERVOIR.GPJ_WSP-OPUS2019_VER11X.GDT_27/8/20

Notes: SPT hammer energy ratio 98%

Started: 22/06/2020
 Drilling Co.: CW Drilling
 Logged by: T Fischer

Finished: 24/06/2020
 Drilling Rig: Hanjan D8
 Checked by: H Hendrickson



BH01 - Box 1



BH01 - Box 2



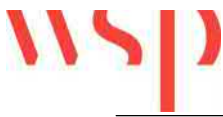
BH01 - Box 3



BH01 - Box 4



BH01 - Box 5



Borehole No. BH002

Project: Richmond South Reservoir and Pipelines
 Client: Tasman District Council
 Project No.: 5-G3141.09
 Location: Refer Location Plan
 Richmond

Coordinates: 1614402 E 5421140 N
 Ref. Grid: NZTM
 R.L.: Approx. 62.6 m
 Datum:
 Depth: 20 m
 Inclination: Vertical

| GEOLOGY | MAIN DESCRIPTION / DETAIL DESCRIPTION | R.L. (m) | DEPTH (m) | GRAPHIC LOG | TESTS | | CORE | | DRILLING | | NOTES / OTHER TESTS | INSTALLATION DETAILS | |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------|-------------|---------------|--------------------------------|-----------|-------------------------|-----------------|--------|---------------------|-------------------------------------------------------|----------------------------|
| | | | | | SPT 'N' VALUE | SPT BLOW COUNTS OR SHEAR VALUE | CORE TYPE | TOTAL CORE RECOVERY (%) | DRILLING METHOD | CASING | | | BASE OF HOLE & WATER LEVEL |
| MOUIERE GRAVELS | Clayey fine to coarse GRAVEL with some sand and trace cobbles; light brown. Very dense; moist; well-graded; sub-rounded to rounded; clay, hard, moist to dry 10.20-10.50m - some fines washed out, gravel becomes sub-angular to -subrounded | 52 | | | 50+ | 35 | | | | | | SPT:Double bouncing, 305 mm remaining, low plasticity | |
| | Clayey fine to coarse SAND with some gravel; light brown. Very dense; moist; well-graded; clay; hard; gravel, well-graded. | 11 | | | | | PQ | 100 | | | | | |
| | Clayey fine to coarse GRAVEL with some sand; light brown. | 12 | | | | | | | | | | | |
| | Clayey fine to coarse GRAVEL with some sand; light brown. Very dense; moist; well-graded; sub-rounded to rounded; clay, low-plasticity, hard, moist to dry; 13.40-13.60m - fines washed out | 50 | | | 50+ | | PQ | 100 | | | | SPT:Double bouncing, no movement, 355 mm remaining | |
| | Sandy fine to coarse GRAVEL with some clay; light brown.moist; gravel, well-graded, sub-rounded to rounded. Clayey fine to coarse GRAVEL with some sand and trace cobbles; light brown. Very dense; moist; well-graded; sub-rounded to rounded; clay, low-plasticity, hard, moist to dry | 13 | | | | 31 | PQ | 85 | | | | | |
| | Sandy fine to coarse GRAVEL with some clay; light brown. Very dense; moist; well-graded; sub-rounded to rounded. Clayey fine to coarse GRAVEL with some sand and trace cobbles; light brown. Very dense; moist; low-plasticity; well-graded; sub-rounded to rounded; clay, low-plasticity, hard, moist to dry | 14 | | | | | | | | | | | |
| | Clayey fine to coarse GRAVEL; light brown. Very dense; moist; well-graded; sub-rounded to rounded (some fines washed out) Clayey fine to coarse GRAVEL with some sand and trace cobbles; light brown. Very dense; moist; well-graded, sub-rounded to rounded; clay, low-plasticity, hard, moist to dry; 17.30-17.40m - fines washed out 17.60-17.80m - dark brown staining on gravels | 48 | | | 50+ | 45 | | | | | | SPT:Double bouncing, no movement, 355 mm remaining | |
| | Clayey fine to coarse GRAVEL; light brown. Very dense; moist; well-graded; sub-rounded to rounded (some fines washed out) | 15 | | | | | PQ | 95 | | | | | |
| | Sandy fine to coarse GRAVEL with some clay; light brown. Very dense; moist; well-graded; sub-rounded to rounded. | 16 | | | | | PQ | 100 | | | | | |
| | Fine to coarse GRAVEL with some sand and clay; light brown. Very dense; moist; well-graded; Clay, low plasticity 19.50-19.70m - fines washed out | 46 | | | 50+ | 43 | PQ | 90 | | | | SPT:Double bouncing, no movement, 330 mm remaining | |
| | | 17 | | | | | PQ | 85 | | | | | |

BOREHOLE SOIL LOG A4 - WSP_RICHMOND RESERVOIR.GPJ_WSP-OPUS2019_VER11X.GDT_11/9/20

Walton park washed gravel pack. 50 mm slotted uPVC wellscreen

Notes: END OF BOREHOLE AT 20m - Target Depth Reached

SPT hammer energy ratio 98%.
 Groundwater at 3.26 m 29/6/20.

Started: 27/06/2020
 Drilling Co.: CW Drilling
 Logged by: R Weston

Finished: 27/06/2020
 Drilling Rig: Hanjan D8
 Checked by: H Hendrickson



BH02 - Box 1



BH02 - Box 2



BH02 - Box 3



BH02 - Box 4



BH02 - Box 5



BH02 - Box 6



BH02 - Box 7



BH02 - Box 8



BH02 - Box 9



BH02 - Box 10