

APPENDIX I

SITE A

GUMLY GUMLY ISLAND, WAGGA WAGGA

TIME DRAWDOWN FIELD DATA

RESULTS of 72 hour pumping test

Job Name AWRC Research Project Line Name Gumly Island,
Wagga Wagga
68/8BORE DESCRIPTION Bore No. 30638 Site No. 4 on PropertyTEST NUMBER 1 PUMPING PERIOD 3.00 pm 26.9.72 to 3.00 pm
29.9.72S.W.L. from Reference Point at Commencement of Test 31.06

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D, Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|------|---------------------------------|------|----------------------|---------------|---|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 3 | 00 | pm | 0 | 0. | 00 | 31. | 06 | | | Pump started |
| | | | 0.135 | 5. | 00 | 36. | 06 | | | |
| | | | 0.23 | 14. | 40 | 45. | 46 | | | |
| | | | 2.0 | 23. | 88 | 54. | 94 | | | |
| | | | 4.33 | 26. | 17 | 57. | 23 | | | |
| | | | 12.2 | 27. | 67 | 58. | 73 | | | |
| | | | 15.25 | 29. | 46 | 60. | 52 | | | |
| | | | 17.50 | 29. | 77 | 60. | 83 | | | |
| | | | 18.5 | 30. | 11 | 61. | 17 | | | |
| | | | 20.0 | 30. | 27 | 61. | 33 | | | |
| | | | 22.5 | 30. | 52 | 61. | 58 | | | |
| | | | 24.0 | 30. | 59 | 61. | 65 | | | |
| | | | 27.0 | 30. | 79 | 61. | 85 | | | |
| | | | 30.0 | 31. | 02 | 62. | 08 | | | |
| | | | 35.0 | 31. | 40 | 62. | 46 | | | |
| | | | 40.0 | 31. | 73 | 62. | 79 | | | |
| | | | 45.0 | 32. | 07 | 63. | 13 | | | |
| | | | 50.0 | 32. | 31 | 63. | 37 | | | |
| | | | 60.0 | 32. | 73 | 63. | 79 | | | |
| | | | 80.0 | 33. | 31 | 64. | 37 | | | |
| | | | 100 | 33. | 83 | 64. | 89 | | | |
| | | | 120 | 34. | 33 | 65. | 39 | | | |
| | | | 150 | 34. | 77 | 65. | 83 | | | |
| | | | 172 | 35. | 23 | 66. | 29 | | | |
| | | | 220 | 35. | 75 | 66. | 81 | | | |
| | | | 270 | 36. | 50 | 67. | 56 | | | |
| | | | 330 | 36. | 44 | 67. | 50 | | | |
| | | | 390 | 36. | 86 | 67. | 92 | | | |
| | | | 480 | 37. | 44 | 68. | 50 | | | |
| | | | 570 | 37. | 77 | 68. | 83 | | | |
| | | | 675 | 38. | 17 | 69. | 23 | | | |

DRAWDOWN SHEET

RESULTS of 72 hour pumping test

Job Name AWRC Research Project Line Name Gumly Island,
68/8 Wagga WaggaBORE DESCRIPTION Bore No. 30577 Site No. 6 on PropertyTEST NUMBER 1 PUMPING PERIOD 3.00 pm 26.9.72 to 29.9.72S.W.L. from Reference Point at Commencement of Test 32.56

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e. g. was water clear throughout & were D. Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|-----------------|---------------------------------|-----------------|----------------------|---------------|--|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 3 | 00 | pm | 0.0 | 0. | 00 | 32. | 56 | | | |
| | | | 1.0 | 2. | 00 | 34. | 56 | | | |
| | | | 2.75 | 3. | 53 | 36. | 09 | | | |
| | | | 5.75 | 4. | 40 | 36. | 96 | | | |
| | | | 7.67 | 4. | 99 | 37. | 55 | | | |
| | | | 8.5 | 5. | 28 | 37. | 84 | | | |
| | | | 9.25 | 5. | 59 | 38. | 15 | | | |
| | | | 12.0 | 6. | 83 | 39. | 39 | | | |
| | | | 16.5 | 7. | 36 | 39. | 92 | | | |
| | | | 19.5 | 8. | 54 | 41. | 10 | | | |
| | | | 26.0 | 9. | 59 | 42. | 15 | | | |
| | | | 34.5 | 10. | 21 | 42. | 77 | | | |
| | | | 40 | 10. | 66 | 43. | 22 | | | |
| | | | 50 | 11. | 23 | 43. | 79 | | | |
| | | | 60 | 11. | 68 | 44. | 24 | | | |
| | | | 80 | 12. | 37 | 44. | 93 | | | |
| | | | 100 | 12. | 93 | 45. | 49 | | | |
| | | | 120 | 13. | 52 | 46. | 08 | | | |
| | | | 152 | 14. | 02 | 46. | 58 | | | |
| | | | 177 | 14. | 43 | 46. | 99 | | | |
| | | | 225 | 15. | 08 | 47. | 64 | | | |
| | | | 276 | 15. | 64 | 48. | 20 | | | |
| | | | 335 | 16. | 08 | 48. | 64 | | | |
| | | | 396 | 16. | 52 | 49. | 08 | | | |
| | | | 484 | 17. | 04 | 49. | 60 | | | |
| | | | 573 | 17. | 54 | 50. | 10 | | | |
| | | | 683 | 17. | 89 | 50. | 45 | | | |
| | | | 879 | 18. | 54 | 51. | 10 | | | |
| | | | 1045 | 18. | 85 | 51. | 41 | | | |
| | | | 1233 | 19. | 23 | 51. | 79 | | | |
| | | | 1345 | 19. | 45 | 52. | 01 | | | |

RESULTS of 72 hour pumping test

| Job Name <u>AWRC Research Project</u> Line Name <u>Gumly Island,</u> | | | | | | | | | | |
|---|-----|----------------|------------------------------|---------------|------|---------------------------------|------|----------------------|---------------|--|
| BORE DESCRIPTION Bore No. <u>30577</u> Site No. <u>7</u> on <u>Wagga Wagga</u> Property | | | | | | | | | | |
| TEST NUMBER <u>1</u> PUMPING PERIOD <u>3.00 pm 26.9.72 to 3.00 pm</u> | | | | | | | | | | |
| S.W.L. from Reference Point at Commencement of Test <u>32.62</u> | | | | | | | | | | |
| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e. g. was water clear throughout & were D. Ds. measured in any other bores |
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 3 | 00 | pm | 0 | 0. | 00 | 32. | 62 | | | Pump started |
| | | | 0.3 | 2. | 00 | 34. | 62 | | | |
| | | | 0.59 | 3. | 49 | 36. | 11 | | | |
| | | | 0.82 | 4. | 39 | 37. | 01 | | | |
| | | | 1.02 | 4. | 98 | 37. | 60 | | | |
| | | | 1.13 | 5. | 29 | 37. | 91 | | | |
| | | | 1.30 | 5. | 60 | 38. | 22 | | | |
| | | | 2.6 | 7. | 49 | 40. | 11 | | | |
| | | | 3.5 | 8. | 49 | 41. | 11 | | | |
| | | | 4.0 | 8. | 98 | 41. | 60 | | | |
| | | | 5.0 | 9. | 43 | 42. | 05 | | | |
| | | | 6.0 | 9. | 87 | 42. | 49 | | | |
| | | | 8.0 | 10. | 72 | 43. | 34 | | | |
| | | | 10.0 | 11 | 31 | 43. | 93 | | | |
| | | | 14.0 | 12. | 20 | 44. | 82 | | | |
| | | | 18.0 | 12. | 91 | 45. | 53 | | | |
| | | | 20.0 | 13. | 37 | 45. | 99 | | | |
| | | | 25.0 | 14. | 01 | 46. | 63 | | | |
| | | | 35.0 | 14. | 89 | 47. | 51 | | | |
| | | | 45.0 | 15. | 44 | 48. | 06 | | | |
| | | | 55.0 | 16. | 10 | 48. | 72 | | | |
| | | | 79.0 | 16. | 95 | 49. | 57 | | | |
| | | | 101.0 | 17. | 62 | 50. | 24 | | | |
| | | | 119.0 | 17. | 95 | 50. | 57 | | | |
| | | | 150.0 | 18. | 46 | 51. | 08 | | | |
| | | | 178.0 | 19. | 04 | 51. | 66 | | | |
| | | | 226.0 | 19. | 62 | 52. | 24 | | | |
| | | | 278.0 | 20. | 12 | 52. | 74 | | | |
| | | | 337.0 | 20. | 44 | 53. | 06 | | | |
| | | | 400 | 20. | 91 | 53. | 53 | | | |
| | | | 487 | 21. | 38 | 54. | 00 | | | |

RESULTS of 72 hour Pumping Test

| Job Name <u>AWRC Research Project</u> Line Name <u>Gumly Island,</u> <u>68/8</u> <u>Wagga Wagga</u> | | | | | | | | | |
|--|-----|------------------------------|---------------|-------|---------------------------------|------|----------------------|---------------|---|
| BORE DESCRIPTION Bore No. <u>30577</u> Site No. <u>8</u> on <u>Property</u> | | | | | | | | | |
| TEST NUMBER <u>1</u> PUMPING PERIOD <u>3.00 pm 26.9.72 to 3.00 pm</u> <u>29.9.72</u> | | | | | | | | | |
| S.W.L. from Reference Point at Commencement of Test <u>32.63</u> | | | | | | | | | |
| Watch Time | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D, Ds. measured in any other bores |
| hr. | min | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 3 | 00 | pm | 0.0 | 0.00 | 22. | 63 | | | |
| | | | 0.13 | 5.00 | 37. | 63 | | | |
| | | | 0.37 | 10.76 | 43. | 39 | | | |
| | | | 0.5 | 14.51 | 47. | 14 | | | |
| | | | 4.0 | 16.85 | 49. | 48 | | | |
| | | | 9.0 | 18.31 | 50. | 94 | | | |
| | | | 12.50 | 19.20 | 51. | 83 | | | |
| | | | 15.00 | 19.79 | 52. | 42 | | | |
| | | | 16.50 | 20.08 | 52. | 71 | | | |
| | | | 19.25 | 20.41 | 53. | 04 | | | |
| | | | 23 | 20.89 | 53. | 52 | | | |
| | | | 30 | 21.45 | 54. | 08 | | | |
| | | | 37 | 21.93 | 54. | 56 | | | |
| | | | 45 | 22.47 | 55. | 10 | | | |
| | | | 55 | 22.91 | 55. | 54 | | | |
| | | | 65 | 23.51 | 56. | 14 | | | |
| | | | 82 | 23.83 | 56. | 46 | | | |
| | | | 101 | 24.35 | 56. | 98 | | | |
| | | | 120 | 24.72 | 57. | 35 | | | |
| | | | 150 | 25.31 | 57. | 94 | | | |
| | | | 175 | 25.70 | 58. | 33 | | | |
| | | | 225 | 26.31 | 58. | 94 | | | |
| | | | 275 | 26.70 | 59. | 33 | | | |
| | | | 334 | 26.97 | 59. | 60 | | | |
| | | | 397 | 27.37 | 60. | 00 | | | |
| | | | 483 | 27.87 | 60. | 50 | | | |
| | | | 574 | 28.24 | 60. | 87 | | | |
| | | | 680 | 28.54 | 61. | 17 | | | |
| | | | 878 | 29.01 | 61. | 64 | | | |
| | | | 1045 | 29.17 | 61. | 90 | | | |
| | | | 1234 | 29.58 | 62. | 21 | | | |

RESULTS of 72 Hour Pumping Test

Job Name AWRC Research Project Line Name Gumly Island, Wagga
68/8 Wagga

BORE DESCRIPTION Bore No. 30602 Site No. _____ on _____ Property _____

TEST NUMBER 1 PUMPING PERIOD 3.00 pm 26.9.72 to 3.00 pm
29.9.72

S.W.L. from Reference Point at Commencement of Test _____

| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D, Ds. measured in any other bores) |
|------------|-----|----------|---------------------|-----------|----------------|---------------------------|----------------|-------------------|------------|---|
| hr. | min | am or pm | | ft. | in. | ft. | in. | Meas-urement | Rate (gph) | |
| 3 | 00 | pm | 0 | 0. | 00 | 32. | 70 | | | Pump started |
| | | | 2 | 0. | 00 | 32. | 70 | | | |
| | | | 4 | 0. | 00 | 32. | 70 | | | |
| | | | 6 | 0. | 00 | 32. | 70 | | | |
| | | | 8 | 0. | 00 | 32. | 70 | | | |
| | | | 10 | 0. | 00 | 32. | 70 | | | |
| | | | 15 | 0. | 10 | 32. | 80 | | | |
| | | | 20 | 0. | 19 | 32. | 89 | | | |
| | | | 25 | 0. | 28 | 32. | 98 | | | |
| | | | 30 | 0. | 33 | 33. | 03 | | | |
| | | | 40 | 0. | 50 | 33. | 20 | | | |
| | | | 50 | 0. | 60 | 33. | 30 | | | |
| | | | 60 | 0. | 72 | 33. | 42 | | | |
| | | | 70 | 0. | 90 | 33. | 60 | | | |
| | | | 80 | 1. | 00 | 33. | 70 | | | |
| | | | 93 | 1. | 12 | 33. | 82 | | | |
| | | | 100 | 1. | 27 | 33. | 97 | | | |
| | | | 132 | 1. | 52 | 34. | 22 | | | |
| | | | 160 | 1. | 78 | 34. | 48 | | | |
| | | | 188 | 2. | 07 | 34. | 77 | | | |
| | | | 370 | 3. | 09 | 35. | 79 | | | |
| | | | 548 | 3. | 85 | 36. | 55 | | | |
| | | | 905 | 4. | 86 | 37. | 56 | | | |
| | | | 1055 | 5. | 53 | 38. | 23 | | | |
| | | | 1390 | 5. | 95 | 38. | 65 | | | |
| | | | 1450 | 6. | 10 | 38. | 80 | | | |
| | | | 1808 | 6. | 33 | 39. | 03 | | | |
| | | | 2030 | 6. | 89 | 39. | 59 | | | |
| | | | 2347 | 7. | 31 | 40. | 01 | | | |
| | | | 2617 | 7. | 75 | 40. | 45 | | | |
| | | | 2820 | 7. | 99 | 40. | 69 | | | |

RESULTS of 72 Hour Pumping Test

Job Name AWRC Research Project Line Name Gumly Island, WaggaBORE 68/8 Wagga
DESCRIPTION Bore No. 30568 Site No. _____ on _____ Property _____TEST NUMBER 1 PUMPING PERIOD 3.00 pm 26.9.72 to 3.00 pmS.W.L. from Reference Point at Commencement of Test 29.9.72
30.84

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D.Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|-----------------|---------------------------------|-----------------|----------------------|---------------|--|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 3 | 00 | pm | 0 | 0. | 00 | 30. | 84 | | | Pump started |
| | | | 1.0 | 9. | 46 | 40. | 30 | | | |
| | | | 2.0 | 12. | 74 | 43. | 58 | | | |
| | | | 2.5 | 13. | 53 | 44. | 37 | | | |
| | | | 3.0 | 14. | 09 | 44. | 93 | | | |
| | | | 3.5 | 14. | 52 | 45. | 36 | | | |
| | | | 4.0 | 14. | 95 | 45. | 79 | | | |
| | | | 4.5 | 15. | 26 | 46. | 10 | | | |
| | | | 5.25 | 15. | 68 | 46. | 25 | | | |
| | | | 6.00 | 16. | 00 | 46. | 84 | | | |
| | | | 6.5 | 16. | 66 | 47. | 50 | | | |
| | | | 8 | 16. | 80 | 47. | 64 | | | |
| | | | 8.5 | 16. | 95 | 47. | 79 | | | |
| | | | 9.0 | 17. | 08 | 47. | 92 | | | |
| | | | 10.0 | 17. | 39 | 48. | 23 | | | |
| | | | 12.0 | 17. | 86 | 48. | 70 | | | |
| | | | 14.0 | 18. | 34 | 49. | 18 | | | |
| | | | 16 | 18. | 67 | 49. | 51 | | | |
| | | | 18 | 12. | 01 | 49. | 85 | | | |
| | | | 20 | 12. | 37 | 50. | 21 | | | |
| | | | 22 | 12. | 53 | 50. | 37 | | | |
| | | | 24 | 19. | 74 | 50. | 58 | | | |
| | | | 26 | 19. | 95 | 50. | 79 | | | |
| | | | 28 | 20. | 26 | 51. | 10 | | | |
| | | | 35 | 20. | 62 | 51. | 46 | | | |
| | | | 40 | 20. | 98 | 51. | 82 | | | |
| | | | 45 | 21. | 26 | 52. | 10 | | | |
| | | | 50 | 21. | 53 | 52. | 37 | | | |
| | | | 55 | 21. | 74 | 52. | 58 | | | |
| | | | 60 | 22. | 00 | 52. | 84 | | | |

DRAWDOWN SHEET

Sheet No. 17

RESULTS of 72 Hour Pumping Test

Job Name AWRC Research Project Line Name Gumly Island,
68/8 Wagga Wagga

BORE DESCRIPTION Bore No. 30568 Site No. on Property

TEST NUMBER 1 PUMPING PERIOD 3.00 pm 26 9.72 to 3.00 pm
29.9.72

S.W.L. from Reference Point at Commencement of Test 30.84

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e. g. was water clear throughout & were D. Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|----------------|---------------------------------|----------------|----------------------|---------------|--|
| hr. | min | am or pm | | ft. | in. | ft. | in. | Meas- urement | Rate (gph) | |
| | | | 75 | 22. | 58 | 53. | 42 | | | |
| | | | 90 | 22. | 91 | 53. | 75 | | | |
| | | | 120 | 23. | 69 | 54. | 53 | | | |
| | | | 150 | 24. | 28 | 55. | 12 | | | |
| | | | 170 | 24. | 58 | 55. | 42 | | | |
| | | | 208 | 25. | 03 | 55. | 87 | | | |
| | | | 238 | 25. | 35 | 55. | 19 | | | |
| | | | 272 | 25. | 64 | 56. | 48 | | | |
| | | | 298 | 25. | 74 | 56. | 58 | | | |
| | | | 328 | 25. | 91 | 56. | 75 | | | |
| | | | 357 | 26. | 08 | 56. | 92 | | | |
| | | | 417 | 26. | 48 | 57. | 32 | | | |
| | | | 478 | 26. | 88 | 57. | 71 | | | |
| | | | 538 | 26. | 95 | 57. | 79 | | | |
| | | | 597 | 27. | 03 | 57. | 87 | | | |
| | | | 657 | 27. | 41 | 58. | 25 | | | |
| | | | 775 | 27. | 70 | 58. | 54 | | | |
| | | | 838 | 27. | 83 | 58. | 67 | | | |
| | | | 955 | 27. | 99 | 58. | 83 | | | |
| | | | 1077 | 28. | 23 | 59. | 07 | | | |
| | | | 1197 | 28. | 56 | 59. | 40 | | | |
| | | | 1437 | 28. | 90 | 59. | 74 | | | |
| | | | 1678 | 29. | 53 | 60. | 37 | | | |
| | | | 1911 | 29. | 91 | 60. | 75 | | | |
| | | | 2218 | 30. | 16 | 61. | 00 | | | |
| | | | 2457 | 30. | 60 | 61. | 44 | | | |
| | | | 2637 | 30. | 73 | 61. | 27 | | | |
| | | | 2877 | 30. | 76 | 61. | 60 | | | |
| | | | 3117 | 31. | 15 | 61. | 99 | | | |
| | | | 3357 | 30 | 62 | 61. | 46 | | | |
| | | | 3597 | 31. | 33 | 62. | 17 | | | |

APPENDIX II

SITE B

ROSEVALE

TIME-DRAWDOWN FIELD DATA

TESTS 1 and 11

DRAWDOWN SHEET

Sheet No. 1

RESULTS of 24 hour pumping test

Job Name A W R C project 68/8 Line Name RosevaleBORE
DESCRIPTION Bore No. 1 Site No. on PropertyTEST NUMBER 1 PUMPING PERIOD 11.0 a.m. 8.6.72 - 11 a.m.
9.6.72

S.W.L. from Reference Point at Commencement of Test 8.06 ft.

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D.Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|-----------------|---------------------------------|-----------------|----------------------|---------------|--|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas- urement | Rate (gph) | |
| 11 | 00 | am | 0 | 0.00 | | 8.06 | | | | Pump started |
| | | | 1.5 | 0.74 | | 8.80 | | | | |
| | | | 3.5 | 0.87 | | 8.93 | | | | |
| | | | 6.5 | 1.03 | | 9.09 | | | | |
| | | | 9.5 | 1.14 | | 9.20 | | | | |
| | | | 11.5 | 1.21 | | 9.27 | | | | |
| | | | 14.5 | 1.29 | | 9.35 | | | | |
| | | | 19.5 | 1.37 | | 9.43 | | | | |
| | | | 24.5 | 1.48 | | 9.54 | | | | |
| | | | 29.5 | 1.56 | | 9.62 | | | | |
| | | | 39.5 | 1.69 | | 9.75 | | | | |
| | | | 49.5 | 1.82 | | 9.86 | | | | |
| | | | 59.5 | 1.89 | | 9.95 | | | | |
| | | | 80 | 2.03 | | 10.09 | | | | |
| | | | 104 | 2.17 | | 10.23 | | | | |
| | | | 120 | 2.24 | | 10.30 | | | | |
| | | | 150 | 2.34 | | 10.40 | | | | |
| | | | 180 | 2.46 | | 10.52 | | | | |
| | | | 211 | 2.51 | | 10.57 | | | | |
| | | | 241 | 2.60 | | 10.66 | | | | |
| | | | 302 | 2.75 | | 10.81 | | | | |
| | | | 360 | 2.88 | | 10.94 | | | | |
| | | | 418 | 2.90 | | 10.96 | | | | |
| | | | 480 | 3.00 | | 11.06 | | | | |
| | | | 540 | 3.15 | | 11.21 | | | | |
| | | | 600 | 3.21 | | 11.27 | | | | |
| | | | 660 | 3.26 | | 11.32 | | | | |
| | | | 720 | 3.32 | | 11.38 | | | | |
| | | | 780 | 3.39 | | 11.45 | | | | |
| | | | 840 | 3.41 | | 11.47 | | | | |
| | | | 905 | 3.45 | | 11.51 | | | | |

DRAWDOWN SHEET

Sheet No. 3

RESULTS of 24 hour pumping test

Job Name AWRC Project 68/8 Line Name RosevaleBORE DESCRIPTION Bore No. 1A Site No. _____ on _____ Property _____TEST NUMBER 1 PUMPING PERIOD 11.00 am - 11 a.m.
8.6.72 - 9.6.72S.W.L. from Reference Point at Commencement of Test 7.90

| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores) |
|------------|-----|----------|---------------------|-----------|-----------------|---------------------------|-----------------|-------------------|------------|--|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas-urement | Rate (gph) | |
| 11 | 00 | am | 0 | 0.00 | 7.90 | | | | | Pump started |
| | | | 1.75 | 0.01 | 7.91 | | | | | |
| | | | 2.75 | 0.00 | 7.90 | | | | | |
| | | | 3.75 | 0.00 | 7.90 | | | | | |
| | | | 6.75 | 0.17 | 8.07 | | | | | |
| | | | 9.75 | 0.35 | 8.25 | | | | | |
| | | | 11.75 | 0.45 | 8.35 | | | | | |
| | | | 14.75 | 0.53 | 8.43 | | | | | |
| | | | 19.75 | 0.70 | 8.60 | | | | | |
| | | | 24.75 | 0.84 | 8.74 | | | | | |
| | | | 29.80 | 0.94 | 8.86 | | | | | |
| | | | 40 | 1.16 | 9.06 | | | | | |
| | | | 50 | 1.34 | 9.24 | | | | | |
| | | | 60 | 1.48 | 9.38 | | | | | |
| | | | 80 | 1.67 | 9.57 | | | | | |
| | | | 104 | 1.86 | 9.76 | | | | | |
| | | | 120 | 1.95 | 9.85 | | | | | |
| | | | 150 | 2.07 | 9.97 | | | | | |
| | | | 180 | 2.19 | 10.09 | | | | | |
| | | | 210 | 2.23 | 10.13 | | | | | |
| | | | 240 | 2.36 | 10.26 | | | | | |
| | | | 300 | 2.52 | 10.42 | | | | | |
| | | | 366 | 2.65 | 10.55 | | | | | |
| | | | 418 | 2.71 | 10.61 | | | | | |
| | | | 480 | 2.77 | 10.67 | | | | | |
| | | | 540 | 2.86 | 10.76 | | | | | |
| | | | 600 | 2.94 | 10.84 | | | | | |
| | | | 660 | 3.02 | 10.92 | | | | | |
| | | | 720 | 3.06 | 10.96 | | | | | |
| | | | 780 | 3.11 | 11.01 | | | | | |
| | | | 840 | 3.17 | 11.07 | | | | | |

DRAWDOWN SHEET

Sheet No. 5

RESULTS of 24 hour pumping test

Job Name AWRC Project 68/8 Line Name RosevaleBORE
DESCRIPTION Bore No. 2 Site No. _____ on _____ Property _____TEST NUMBER 1 PUMPING PERIOD 11.00 am - 11.00 am
8.6.72 - 9.6.72

S.W.L. from Reference Point at Commencement of Test

| Watch Time | | | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|---------------|---------------------|---------------------------------|---------------------|----------------------|---------------|---|
| hr. | min | am or pm | | ft. | in ex | ft. | in ex | Meas- urement | Rate (gph) | |
| 11 | 00 | am | 0 | 0. | 00 | 9. | 70 | | | Pump started |
| | | | 1 | 1. | 55 | 11. | 25 | | | |
| | | | 2 | 1. | 70 | 11. | 40 | | | |
| | | | 3 | 1. | 78 | 11. | 48 | | | |
| | | | 4 | 1. | 84 | 11. | 54 | | | |
| | | | 6 | 1. | 93 | 11. | 63 | | | |
| | | | 8 | 2. | 02 | 11. | 72 | | | |
| | | | 10 | 2. | 08 | 11. | 78 | | | |
| | | | 15 | 2. | 23 | 11. | 93 | | | |
| | | | 20 | 2. | 33 | 12. | 03 | | | |
| | | | 25 | 2. | 42 | 12. | 12 | | | |
| | | | 30 | 2. | 50 | 12. | 20 | | | |
| | | | 40 | 2. | 60 | 12. | 30 | | | |
| | | | 50 | 2. | 72 | 12. | 42 | | | |
| | | | 60 | 2. | 83 | 12. | 53 | | | |
| | | | 80 | 2. | 99 | 12. | 69 | | | |
| | | | 103 | 3. | 07 | 12. | 77 | | | |
| | | | 120 | 3. | 15 | 12. | 85 | | | |
| | | | 150 | 3. | 27 | 12. | 97 | | | |
| | | | 180 | 3. | 36 | 13. | 06 | | | |
| | | | 210 | 3. | 46 | 13. | 16 | | | |
| | | | 240 | 3. | 52 | 13. | 22 | | | |
| | | | 300 | 3. | 65 | 13. | 35 | | | |
| | | | 360 | 3. | 80 | 13. | 50 | | | |
| | | | 420 | 3. | 88 | 13. | 58 | | | |
| | | | 480 | 4. | 02 | 13. | 72 | | | |
| | | | 540 | 4. | 05 | 13. | 75 | | | |
| | | | 600 | 4. | 12 | 13. | 82 | | | |
| | | | 660 | 4. | 20 | 13. | 90 | | | |
| | | | 720 | 4. | 25 | 13. | 95 | | | |
| | | | 780 | 4. | 32 | 14. | 02 | | | |

DRAWDOWN SHEET

Sheet No. 7

RESULTS of 24 hour pumping test

Job Name AWRC Project 68/8 Line Name Rosevale

BORE

DESCRIPTION Bore No.3 (P.B.) Site No. on Property

TEST NUMBER 1 PUMPING PERIOD 11 a.m. - 11 a.m.
8.6.72 - 9.6.72S.W.L. from Reference Point at Commencement of Test 0.20

| Watch Time | | | Time reg'd in mins. | Draw- down | | Reading from Hg Man. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores air tube not press- urised. |
|------------|-----|----------------|------------------------------|---------------|------|-------------------------|-------------|----------------------|---------------|---|
| hr. | min | am or pm | | ft. | ins. | ft. ins. | ins. RHT | Meas- urement | Rate (gph) | |
| 11 | 00 | am | 0 | 0. | 20 | -0.45 | +0.45 | | | |
| | | | 0 | 0. | 20 | 11.55 | 10.75 | | | |
| | | | 1 | 13. | 55 | 5.65 | 4.85 | | | |
| | | | 2 | 14. | 00 | 5.40 | 4.55 | | | |
| | | | 3 | 15. | 15 | 4.90 | 4.05 | 18.25" | 7050 | |
| | | | 4 | 15. | 15 | 4.90 | 4.05 | " | " | |
| | | | 6 | 15. | 50 | 4.70 | 3.90 | " | " | |
| | | | 8 | 15. | 75 | 4.60 | 3.80 | " | " | |
| | | | 10 | 16. | 05 | 4.50 | 3.65 | " | " | |
| | | | 12 | 16. | 25 | 4.40 | 3.55 | " | " | |
| | | | 15 | 16. | 32 | 4.40 | 3.50 | 18.50 | 7100 | |
| | | | 20 | 16. | 60 | 4.25 | 3.40 | " | " | |
| | | | 25 | 16. | 72 | 4.20 | 3.35 | " | " | |
| | | | 30 | 16. | 82 | 4.15 | 3.30 | 18.25 | 7050 | |
| | | | 40 | 17. | 17 | 4.00 | 3.15 | " | " | |
| | | | 50 | 17. | 40 | 3.90 | 3.05 | " | " | |
| | | | 60 | 17. | 50 | 3.85 | 3.00 | " | " | |
| | | | 82 | 17. | 85 | 3.70 | 2.85 | " | " | |
| | | | 100 | 18. | 08 | 3.60 | 2.75 | " | " | |
| | | | 120 | 18. | 18 | 3.55 | 2.70 | 18.00 | 7000 | |
| | | | 148 | 18. | 49 | 3.45 | 2.55 | " | " | |
| | | | 180 | 18. | 75 | 3.30 | 2.45 | " | " | |
| | | | 210 | 18. | 87 | 3.25 | 2.40 | " | " | |
| | | | 240 | 19. | 10 | 3.15 | 2.30 | " | " | |
| | | | 302 | 19. | 20 | 3.10 | 2.25 | 17.75 | 6950 | |
| | | | 360 | 19. | 55 | 2.95 | 2.10 | 18.25 | 7050 | |
| | | | 422 | 19. | 80 | 2.85 | 2.00 | " | " | |
| | | | 480 | 19. | 90 | 2.80 | 1.95 | " | " | |
| | | | 540 | 20. | 00 | 2.75 | 1.90 | 18.25 | 7050 | |
| | | | 600 | 20. | 20 | 2.65 | 1.80 | " | " | |
| | | | 660 | 20. | 30 | 2.60 | 1.80 | " | " | |

DRAWDOWN SHEET

Sheet No. 9

RESULTS of 24 hour pumping test

Job Name AWRC Project 68/8 Line Name Rosevale

| BORE DESCRIPTION | | | Bore No. 4 | Site No. | on | Property | | | | |
|---|-----|----------|---------------------|----------------|------|---------------------------|--------------------|-------------------|------------|--|
| TEST NUMBER | | | 1 | PUMPING PERIOD | | 11.00 am 8.6.72 | 11.00 am 9.6.72 | | | |
| S.W.L. from Reference Point at Commencement of Test | | | | | | | | | | |
| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores) |
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Measurement | Rate (gph) | |
| 11 | 00 | am | 0 | 0. | 00 | 10. | 58 | | | Pump started |
| | | | 1.5 | 0. | 65 | 11. | 23 | | | |
| | | | 4 | 0. | 77 | 11. | 35 | | | |
| | | | 7 | 0. | 91 | 11. | 49 | | | |
| | | | 10 | 1. | 01 | 11. | 59 | | | |
| | | | 12 | 1. | 05 | 11. | 63 | | | |
| | | | 15 | 1. | 18 | 11. | 76 | | | |
| | | | 20 | 1. | 22 | 11. | 80 | | | |
| | | | 25 | 1. | 34 | 11. | 92 | | | |
| | | | 30 | 1. | 42 | 12. | 00 | | | |
| | | | 40 | 1. | 56 | 12. | 14 | | | |
| | | | 50 | 1. | 70 | 12. | 28 | | | |
| | | | 60 | 1. | 74 | 12. | 32 | | | |
| | | | 80 | 1. | 87 | 12. | 45 | | | |
| | | | 105 | 2. | 02 | 12. | 60 | | | |
| | | | 120 | 2. | 11 | 12. | 69 | | | |
| | | | 150 | 2. | 21 | 12. | 79 | | | |
| | | | 182 | 2. | 30 | 12. | 88 | | | |
| | | | 213 | 2. | 38 | 12. | 96 | | | |
| | | | 240 | 2. | 45 | 13. | 03 | | | |
| | | | 303 | 2. | 60 | 13. | 18 | | | |
| | | | 362 | 2. | 71 | 13. | 29 | | | |
| | | | 420 | 2. | 81 | 13. | 39 | | | |
| | | | 480 | 2. | 90 | 13. | 48 | | | |
| | | | 540 | 2. | 99 | 13. | 57 | | | |
| | | | 600 | 3. | 04 | 13. | 62 | | | |
| | | | 720 | 3. | 14 | 13. | 74 | | | |
| | | | 780 | 3. | 22 | 13. | 80 | | | |
| | | | 840 | 3. | 28 | 13. | 86 | | | |
| | | | 903 | 3. | 34 | 13. | 92 | | | |

DRAWDOWN SHEET

RESULTS of 24 hour pumping test

Job Name AWRC Project 68/8 Line Name Rosevale

BORE DESCRIPTION Bore No. 14S9A Site No. _____ on _____ Property _____

TEST NUMBER 1 PUMPING PERIOD 11.00 am - 1.00 am
8.6.72 - 9.6.72

S.W.L. from Reference Point at Commencement of Test 9.43

| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores) |
|------------|-----|----------|---------------------|-----------|-----------------|---------------------------|-----------------|-------------------|------------|---|
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas-urement | Rate (gph) | |
| 11 | 00 | am | 0 | 0. | 0 | 9. | 43 | | | Pump started |
| | | | 1 | 0. | 37 | 9. | 80 | | | |
| | | | 2 | 0. | 63 | 10. | 60 | | | |
| | | | 3 | 0. | 77 | 10. | 20 | | | |
| | | | 4 | 0. | 88 | 10. | 31 | | | |
| | | | 6 | 0. | 96 | 10. | 39 | | | |
| | | | 8 | 1. | 05 | 10. | 48 | | | |
| | | | 10 | 1. | 08 | 10. | 55 | | | |
| | | | 15 | 1. | 29 | 10. | 72 | | | |
| | | | 20 | 1. | 43 | 10. | 86 | | | |
| | | | 25 | 1. | 51 | 10. | 94 | | | |
| | | | 30 | 1. | 56 | 10. | 99 | | | |
| | | | 40 | 1. | 62 | 11. | 15 | | | |
| | | | 50 | 1. | 71 | 11. | 24 | | | |
| | | | 60 | 1. | 79 | 11. | 32 | | | |
| | | | 80 | 1. | 93 | 11. | 46 | | | |
| | | | 106 | 2. | 10 | 11. | 63 | | | |
| | | | 122 | 2. | 14 | 11. | 67 | | | |
| | | | 150 | 2. | 28 | 11. | 81 | | | |
| | | | 180 | 2. | 37 | 11. | 90 | | | |
| | | | 215 | 2. | 47 | 12. | 00 | | | |
| | | | 241 | 2. | 52 | 12. | 05 | | | |
| | | | 303 | 2. | 64 | 12. | 17 | | | |
| | | | 360 | 2. | 79 | 12. | 32 | | | |
| | | | 415 | 2. | 88 | 12. | 41 | | | |
| | | | 480 | 3. | 13 | 12. | 56 | | | |
| | | | 546 | 3. | 18 | 12. | 61 | | | |
| | | | 600 | 3. | 22 | 12. | 65 | | | |
| | | | 660 | 3. | 28 | 12. | 71 | | | |
| | | | 720 | 3. | 33 | 12. | 76 | | | |

DRAWDOWN SHEET

Sheet No. 1

RESULTS of 6 hour pumping test

Job Name AWRC Research Project Line Name Rosevale
68/8

BORE DESCRIPTION Bore No. 1 Site No. on Property

TEST NUMBER 11 PUMPING PERIOD 9.30 - 13.30 13.2.73

S.W.L. from Reference Point at Commencement of Test 6.32

| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores |
|------------|-----|----------------|------------------------------|-----------|---------------|---------------------------------|---------------|----------------------|---------------|---|
| hr. | min | am or pm | | ft. | in | ft. | in | Meas- urement | Rate (gph) | |
| 9 | 30 | am | 0 | 0. | 00 | 6. | 32 | | | Pump started |
| | | | 0.25 | 0. | 35 | 6. | 67 | | | |
| | | | 0.50 | 0. | 56 | 6. | 88 | | | |
| | | | 0.75 | 0. | 68 | 7. | 00 | | | |
| | | | 1 | 0. | 77 | 7. | 09 | | | |
| | | | 2 | 0. | 92 | 7. | 24 | | | |
| | | | 3 | 1. | 02 | 7. | 34 | | | |
| | | | 4 | 1. | 07 | 7. | 39 | | | |
| | | | 5 | 1. | 15 | 7. | 47 | | | |
| | | | 6 | 1. | 18 | 7. | 50 | | | |
| | | | 8 | 1. | 35 | 7. | 67 | | | |
| | | | 10 | 1. | 36 | 7. | 68 | | | |
| | | | 12 | 1. | 40 | 7. | 72 | | | |
| | | | 15 | 1. | 46 | 7. | 78 | | | |
| | | | 20 | 1. | 49 | 7. | 81 | | | |
| | | | 25 | 1. | 60 | 7. | 92 | | | |
| | | | 30 | 1. | 58 | 7. | 90 | | | |
| | | | 40 | 1. | 85 | 8. | 17 | | | |
| | | | 50 | 1. | 88 | 8. | 20 | | | |
| | | | 60 | 1. | 91 | 8. | 23 | | | |
| | | | 80 | 2. | 03 | 8. | 35 | | | |
| | | | 100 | 2. | 12 | 8. | 44 | | | |
| | | | 120 | 2. | 22 | 8. | 54 | | | |
| | | | 150 | 2. | 30 | 8. | 62 | | | |
| | | | 180 | 2. | 38 | 8. | 70 | | | |
| | | | 210 | 2. | 52 | 8. | 84 | | | |
| | | | 240 | 2. | 64 | 8. | 96 | | | |
| | | | 270 | 2. | 48 | 8. | 80 | | | |
| | | | 300 | 2. | 58 | 8. | 90 | | | |
| | | | 330 | 2. | 63 | 8. | 95 | | | |
| 1 | 30 | pm | 360 | 2. | 65 | 8. | 97 | | | Pump stopped |

RESULTS of 6 hour Pumping Test

Job Name AWRC Research Project Line Name Rosevale
68/8BORE
DESCRIPTION Bore No. 1A Site No. _____ on _____ Property _____TEST NUMBER 11 PUMPING PERIOD 9.30 - 13.30 13.2.73

S.W.L. from Reference Point at Commencement of Test

| Watch Time hr. min. am or pm | Time reg'd in mins. | Draw- down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores |
|---------------------------------------|------------------------------|---------------|----------------|---------------------------------|----------------|----------------------|---------------|---|
| | | ft. | xxx | ft. | xxx | Meas- urement | Rate (gph) | |
| 9 30 am | 0 | 0. | 00 | 6. | 30 | | | Pump started |
| | 0.25 | 0. | 03 | 6. | 33 | | | |
| | 0.5 | 0. | 04 | 6. | 34 | | | |
| | 0.75 | 0. | 04 | 6. | 34 | | | |
| | 1 | 0. | 05 | 6. | 35 | | | |
| | 2 | 0. | 07 | 6. | 37 | | | |
| | 3 | 0. | 05 | 6. | 35 | | | |
| | 4 | 0. | 06 | 6. | 36 | | | |
| | 5 | 0. | 06 | 6. | 36 | | | |
| | 6 | 0. | 07 | 6. | 37 | | | |
| | 8 | 0. | 07 | 6. | 37 | | | |
| | 10 | 0. | 07 | 6. | 37 | | | |
| | 12 | 0. | 07 | 6. | 37 | | | |
| | 15 | 0. | 08 | 6. | 38 | | | |
| | 20 | 0. | 10 | 6. | 40 | | | |
| | 25 | 0. | 12 | 6. | 42 | | | |
| | 30 | 0. | 15 | 6. | 45 | | | |
| | 40 | 0. | 19 | 6. | 49 | | | |
| | 50 | 0. | 26 | 6. | 56 | | | |
| | 60 | 0. | 31 | 6. | 61 | | | |
| | 80 | 0. | 40 | 6. | 70 | | | |
| | 100 | 0. | 51 | 6. | 81 | | | |
| | 120 | 0. | 62 | 6. | 92 | | | |
| | 150 | 0. | 73 | 7. | 03 | | | |
| | 180 | 0. | 86 | 7. | 16 | | | |
| | 210 | 1. | 00 | 7. | 30 | | | |
| | 240 | 1. | 10 | 7. | 40 | | | |
| | 270 | 1. | 20 | 7. | 50 | | | |
| | 300 | 1. | 28 | 7. | 58 | | | |
| | 330 | 1. | 37 | 7. | 67 | | | |
| 1 30 pm | 360 | 1. | 42 | 7. | 72 | | | Pump stopped |

DRAWDOWN SHEET

Sheet No. 3

RESULTS of 6 hour Pumping Test

| Job Name <u>AWRC Research Project</u> Line Name <u>Rosevale</u> | | | | | | | | | | |
|---|-----|------------|----------------|-----------------|---------------------------|-----------------|-------------------|------------|--|--|
| BORE <u>68/8</u> | | | | | | | | | | |
| DESCRIPTION | | Bore No. | 2 | Site No. | on | Property | | | | |
| TEST NUMBER | | 11 | PUMPING PERIOD | | | 9.30 - 13.30 | 13.2.73 | | | |
| S.W.L. from Reference Point at Commencement of Test <u>6.51</u> | | | | | | | | | | |
| Watch Time | | Time reg'd | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores) | |
| hr. | min | in mins. | ft. | ins. | ft. | ins. | Measurement | Rate (gph) | | |
| 9 | 30 | am | 0 | 0.00 | 6. | 51 | | | Pump started | |
| | | | 0.25 | 0.07 | 6. | 58 | | | | |
| | | | 0.50 | 0.15 | 6. | 66 | | | | |
| | | | 0.75 | 0.23 | 6. | 74 | | | | |
| | | | 1.0 | 0.33 | 6. | 84 | | | | |
| | | | 1.25 | 0.40 | 6. | 91 | | | | |
| | | | 1.50 | 0.49 | 7. | 00 | | | | |
| | | | 1.75 | 0.56 | 7. | 07 | | | | |
| | | | 2 | 0.64 | 7. | 15 | | | | |
| | | | 3 | 0.94 | 7. | 45 | | | | |
| | | | 4 | 1.22 | 7. | 73 | | | | |
| | | | 5 | 1.40 | 7. | 91 | | | | |
| | | | 6 | 1.59 | 8. | 10 | | | | |
| | | | 7 | 1.76 | 8. | 27 | | | | |
| | | | 8 | 1.89 | 8. | 40 | | | | |
| | | | 9 | 1.99 | 8. | 50 | | | | |
| | | | 10 | 2.07 | 8. | 58 | | | | |
| | | | 11.25 | 2.13 | 8. | 64 | | | | |
| | | | 12.5 | 2.19 | 8. | 70 | | | | |
| | | | 15 | 2.31 | 8. | 82 | | | | |
| | | | 20 | 2.41 | 8. | 92 | | | | |
| | | | 30 | 2.59 | 9. | 10 | | | | |
| | | | 40 | 2.69 | 9. | 20 | | | | |
| | | | 50 | 2.76 | 9. | 27 | | | | |
| | | | 60 | 2.82 | 9. | 33 | | | | |
| | | | 80 | 2.94 | 9. | 45 | | | | |
| | | | 100 | 3.03 | 9. | 54 | | | | |
| | | | 120 | 3.11 | 9. | 63 | | | | |
| | | | 150 | 3.21 | 9. | 72 | | | | |
| | | | 180 | 3.34 | 9. | 85 | | | | |
| | | | 210 | 3.39 | 9. | 90 | | | | |

DRAWDOWN SHEET

Sheet No 5

RESULTS of 6 hour Pumping test

| Job Name <u>AWRC Research Project</u> Line Name <u>Rosevale</u> | | | | | | | | | | |
|---|-----|----------|--------------------------|-----------|-----------------|---------------------------|---------------------|-------------------------------------|----------------|---|
| BORE <u>68/8</u> | | | | | | | | | | |
| DESCRIPTION | | | Bore No. <u>3 (P.B.)</u> | | Site No. | | on | | Property | |
| TEST NUMBER | | | <u>11</u> | | PUMPING PERIOD | | <u>9.30 - 13.30</u> | | <u>13.2.73</u> | |
| S.W.L. from Reference Point at Commencement of Test <u>6.42</u> | | | | | | | | | | |
| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D. Ds. measured in any other bores) |
| hr. | min | am or pm | | ft. | ins. | ft. | ins. | Meas-urement (in) (100 gallon tank) | Rate (gph) | |
| 9 | 30 | am | 0 | 0 | 00 | 6 | 42 | | 7200 | Pump started |
| | | | 0.25 | 9 | 95 | 16 | 37 | | | Water cloudy |
| | | | 0.50 | 11 | 78 | 18 | 20 | | | |
| | | | 0.75 | 12 | 98 | 19 | 40 | | | |
| | | | 1.0 | 13 | 78 | 20 | 20 | | | |
| | | | 1.25 | 14 | 48 | 20 | 90 | | | Water cloudy |
| | | | 1.50 | 14 | 98 | 21 | 40 | | | |
| | | | 1.75 | 15 | 18 | 21 | 60 | | | |
| | | | 2.0 | 15 | 38 | 21 | 80 | | | Small amount of sandy grit |
| | | | 2.25 | 15 | 73 | 22 | 15 | | | |
| | | | 2.5 | 15 | 86 | 22 | 28 | | | |
| | | | 2.75 | 15 | 96 | 22 | 38 | | | |
| | | | 3 | 15 | 92 | 22 | 34 | | | |
| | | | 4 | 15 | 98 | 22 | 40 | | | |
| | | | 5 | 16 | 48 | 22 | 90 | 17.5 | | |
| | | | 6 | 15 | 88 | 22 | 30 | | | |
| | | | 8 | 15 | 86 | 22 | 28 | | | Water clearing |
| | | | 10 | 15 | 04 | 21 | 46 | | | |
| | | | 12 | 14 | 93 | 21 | 35 | | | Water clear |
| | | | 14 | 14 | 74 | 21 | 16 | | | |
| | | | 15 | 14 | 71 | 21 | 13 | 18.5 | | |
| | | | 20 | 14 | 73 | 21 | 15 | | | |
| | | | 25 | 14 | 88 | 21 | 30 | | | |
| | | | 30 | 14 | 67 | 21 | 09 | | | |
| | | | 40 | 14 | 35 | 20 | 77 | 18.5 | | |
| | | | 50 | 14 | 53 | 20 | 95 | | | |
| | | | 60 | 14 | 38 | 20 | 80 | | | |
| | | | 80 | 14 | 36 | 20 | 78 | 17.5 | | |
| | | | 100 | 14 | 56 | 20 | 98 | 17.25 | | |
| | | | 120 | 14 | 53 | 20 | 95 | 17.00 | | |
| | | | 150 | 14 | 59 | 21 | 01 | | | |

DRAWDOWN SHEET

Sheet No. 7

RESULTS of 6 hour Pumping Test

Job Name AWRC Research Project Line Name Rosevale
68/8

| BORE DESCRIPTION | | | Bore No. | 4 | Site No. | on | Property | | | |
|---|-----|----------------|---------------------------|----------------|----------------------|---------------------------------|----------------------|----------------------|---------------|--|
| TEST NUMBER | | | 11 | PUMPING PERIOD | | 9.30 - 13.30 | 13.2.73 | | | |
| S.W.L. from Reference Point at Commencement of Test | | | | | | | | | | |
| Watch Time | | | Time reg'd in mins. | Draw-down | | Water Level from Ref. Pt. | | Rate Measurements | | Remarks (e.g. was water clear throughout & were D.Ds. measured in any other bores |
| hr. | min | am or pm | | ft. | in xxx | ft. | in xxx | Meas- urement | Rate (gph) | |
| 9 | 30 | am | 0 | 0 | 00 | 6 | 99 | | | Pump started |
| | | | 1 | 0 | 61 | 7 | 60 | | | |
| | | | 2 | 0 | 69 | 7 | 68 | | | |
| | | | 3 | 0 | 76 | 7 | 75 | | | |
| | | | 4 | 0 | 81 | 7 | 80 | | | |
| | | | 5 | 0 | 87 | 7 | 86 | | | |
| | | | 6 | 0 | 92 | 7 | 91 | | | |
| | | | 8 | 0 | 99 | 7 | 98 | | | |
| | | | 10 | 1 | 03 | 8 | 02 | | | |
| | | | 12 | 1 | 07 | 8 | 06 | | | |
| | | | 15 | 1 | 12 | 8 | 11 | | | |
| | | | 20 | 1 | 22 | 8 | 21 | | | |
| | | | 25 | 1 | 31 | 8 | 30 | | | |
| | | | 30 | 1 | 35 | 8 | 34 | | | |
| | | | 40 | 1 | 50 | 8 | 49 | | | |
| | | | 50 | 1 | 59 | 8 | 58 | | | |
| | | | 60 | 1 | 66 | 8 | 65 | | | |
| | | | 80 | 1 | 79 | 8 | 78 | | | |
| | | | 100 | 1 | 86 | 8 | 85 | | | |
| | | | 120 | 1 | 96 | 8 | 95 | | | |
| | | | 150 | 2 | 05 | 9 | 04 | | | |
| | | | 180 | 2 | 14 | 9 | 13 | | | |
| | | | 210 | 2 | 24 | 9 | 23 | | | |
| | | | 240 | 2 | 29 | 9 | 28 | | | |
| | | | 270 | 2 | 28 | 9 | 27 | | | |
| | | | 300 | 2 | 32 | 9 | 31 | | | |
| | | | 330 | 2 | 38 | 9 | 37 | | | |
| 1 | 30 | pm | 360 | 2 | 42 | 9 | 41 | | | Pump stopped |

APPENDIX III

MULTIPLE CONTACT ELECTRIC PROBE FOR THE MEASUREMENT
OF RAPIDLY VARYING WATER LEVELS

1. Introduction

The analysis of time-drawdown data from a production well and close observation wells to determine local aquifer characteristics and investigate well losses require water levels to be monitored during the early periods of pumping or recovery tests. A simple, cheap and reliable means of following rapidly varying water levels was required to obtain the desired information for this project.

It was considered that whilst methods presently used for pumping tests provide the required reliability and accuracy when water levels are changing slowly, they would not provide the desired results during the early stages of tests when water levels are falling rapidly.

It is possible to use pressure transducers but the cost of the transducers, bridges and recorders to fully monitor a field test is very high.

As a much cheaper alternative, a series of discrete readings at time intervals which could be measured by a stopwatch would suffice, if a suitable method of indicating the passage of the water surface past a number predetermined depths could be devised.

The instrument described in this Appendix provides a cheap, reliable and sufficiently accurate means of following rapidly falling or rising water levels. When water levels are altering rapidly, the observer records the illumination or extinguishing of lamps actuated by series of electrical contacts. When water levels are falling slowly, the instrument may be used in the same manner as a single electric probe. The whole installation and carrying case is reasonably light in weight and sufficiently robust for extended field use.

2. Construction

2.1 General

The instrument consists basically of two detachable components, namely:-

- (i) the probe,
- (ii) the electronic circuitry.

When the instrument is not in use the probe section can be stored in the carrying case containing the electronics.

To prepare the instrument for use, the probe is connected to the

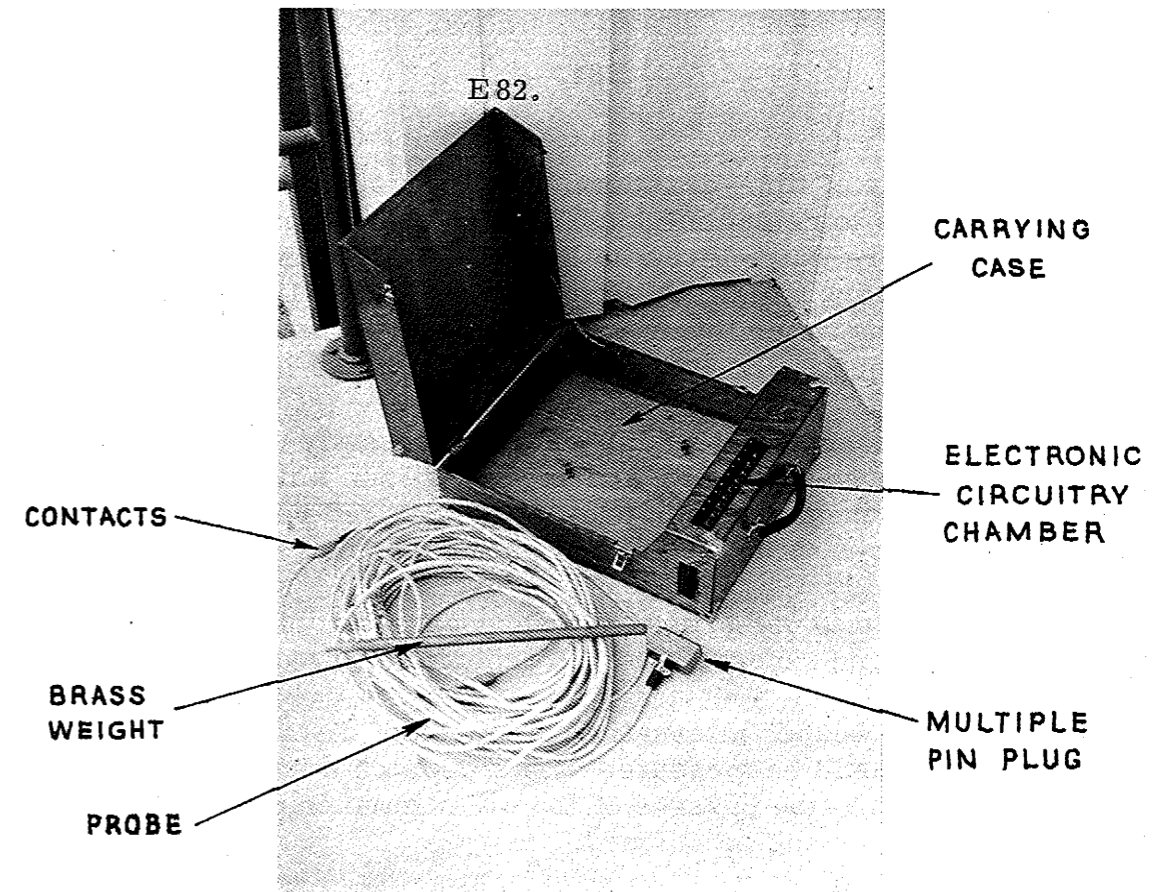


Fig. III-1 Multiple Contact Electric Probe.

electronic circuitry by means of a multiple pin plug and socket (Fig. III-1).

The carrying case (Fig. III-1) is constructed of plywood and light bulbs of the electronic circuitry protected by, but visible through, a clear perspex window located at the top end of the box directly over the electronic circuitry chamber.

2.2 The Probe

Ten pairs of electric contacts are spaced exponentially over a 40 ft. length (Fig. III-2) of a 100 ft. ten pair telephone cable. Each pair of contacts is set into the surface of P.V.C. sleeves fixed to the protective P.V.C. casing of the cable. The contacts were made by cutting pairs of wires and passing the ends through countersunk holes in the sleeves. The holes were filled with solder and the solder filed flush with the surface of the sleeve (Fig. III-3) to leave contact surfaces approximately 1/16th inch in diameter. Three applications of water proofing P.V.C. paint were used to fill cavities where water might penetrate around the sleeves.

A 2 lb. weight was used to keep the cable taut when hanging in the well.

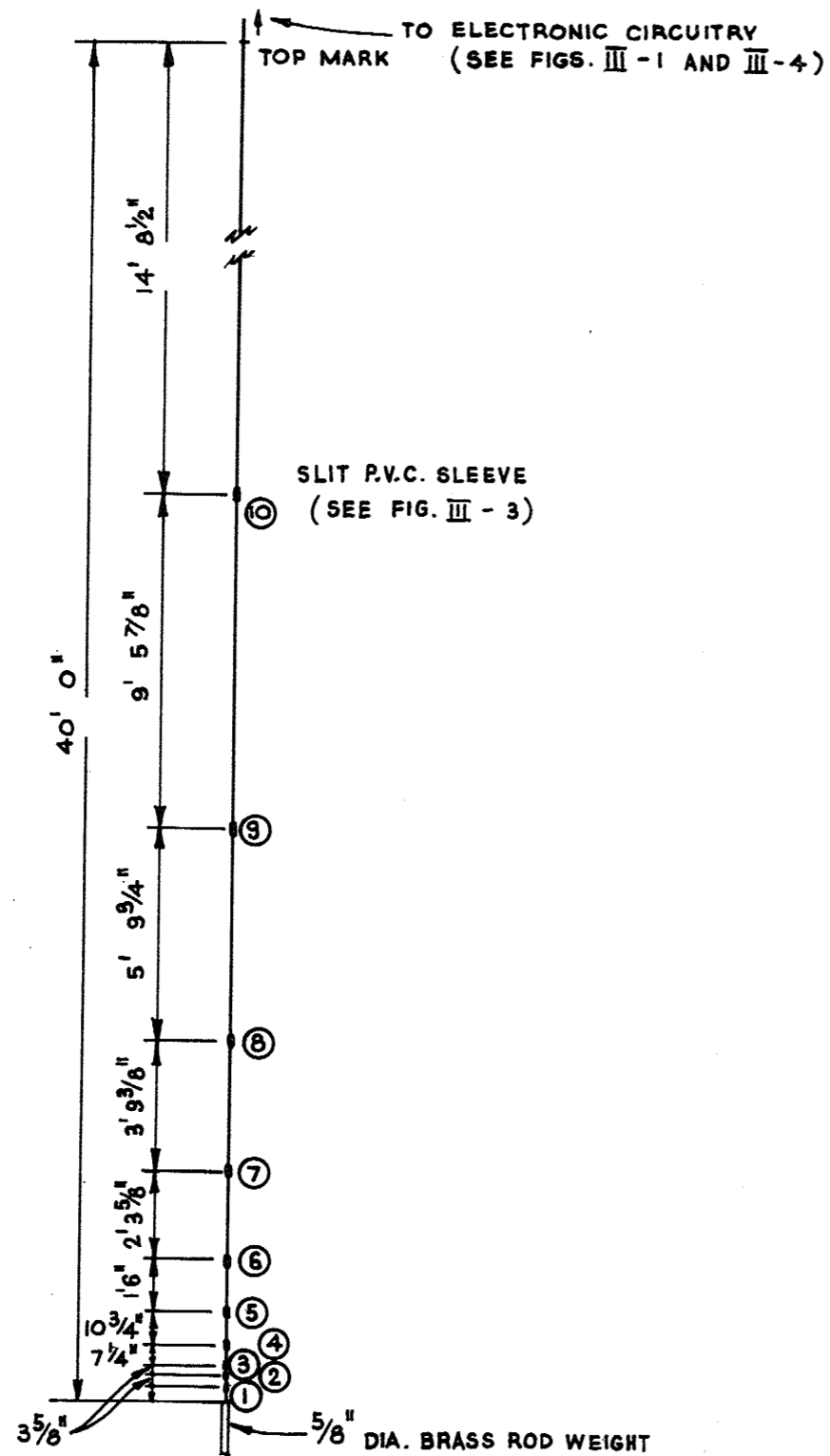


Fig. III-2: Spacing of Contacts.

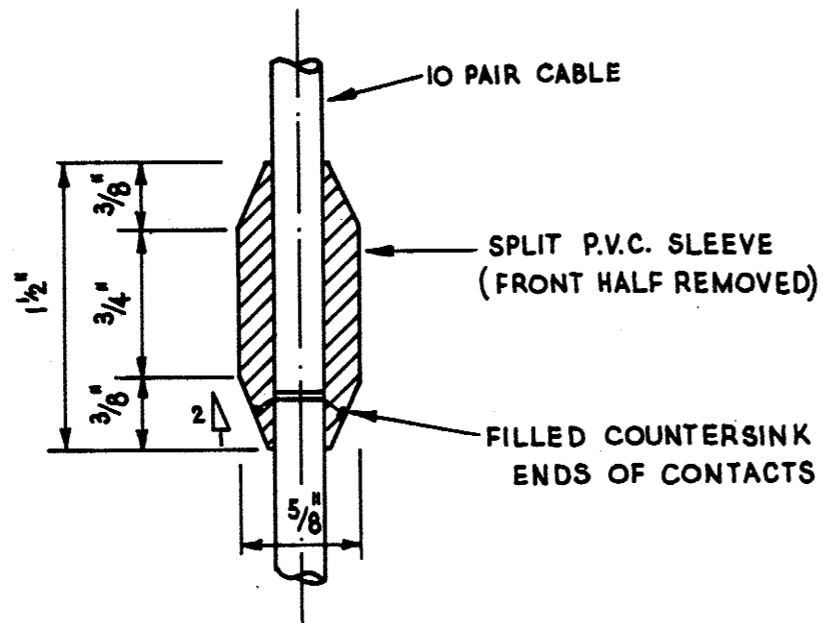


Fig. III-3: Detail of P.V.C. Sleeves

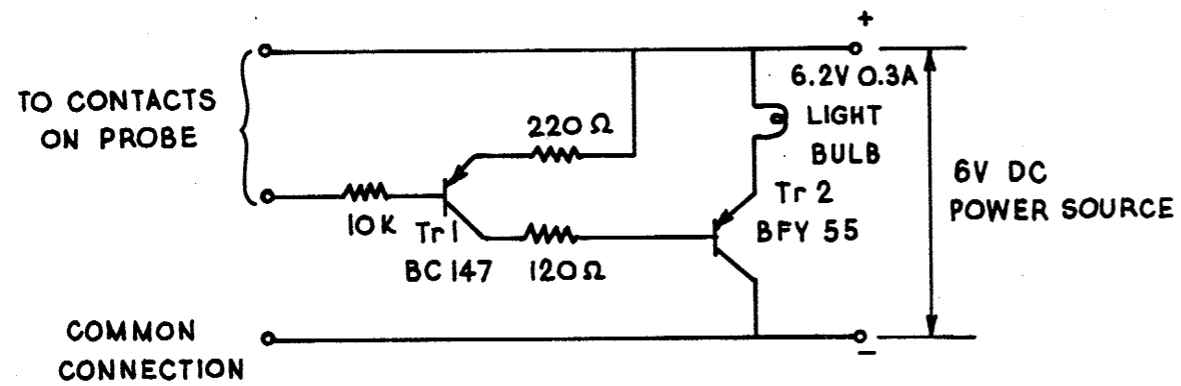


Fig. III-4: Basic Amplifier Unit

2.3 Electronics

When the probe is connected to the electronic circuitry, each pair of contact points is connected to its own basic amplifier unit. The basic amplifier unit is presented in Fig. III-4.

When water bridges the contacts a small current (0.29A) is permitted to flow in the base of T_{R1} , turning it on sufficiently to bias T_{R2} into the conducting mode. The 6.2V, 0.3A light bulb which is acting as the T_{R2} collector load is illuminated.

The resistor in the base of T_{R1} is to reduce the sensitivity of the instrument when it is used in water of high conductivity and guard against accidental short circuit of the contacts with resultant damage to T_{R1} .

Ten basic amplifier units were assembled into a "bank of units" with a common connection to the negative terminal of a 6V heavy duty battery.

The minimum current to extinguish the illuminated bulb was determined as $0.04 \mu A$.

3. Operation

Before the commencement of a pumping test, the probe is lowered into the well and the depth to the non pumping water level measured using the bottom set of contacts. The probe is then lowered until the bottom set of contacts is just below the level to which the water surface will fall during the first 10 minutes of pumping. Lights associated with submerged sets of contacts will then be illuminated.

During the early stages of pumping the observer watches the lights and records the time at which each light is extinguished. Later when water levels are falling slowly, the probe is used in the same manner as a single contact electric probe by lowering it until the bottom set of contacts meets the water surface.

APPENDIX IV

REGIONAL FLOW MODEL

FINITE DIFFERENCE DIGITAL COMPUTER PROGRAMME

The finite difference digital computer programme presented by Prickett and Lonquist was modified to enable compilation and execution on an IBM360 system 50 computer. The modifications made were -

- (i) expansion of the implied D_0 loops in the determination of the B and G arrays of the column and row calculations. During execution of the original programme listing presented, zero subscripts were obtained in the determination of the B and G arrays;
- (ii) alteration of the input and output data formats. The altered input data formats are presented in Fig. IV-1;
- (iii) insertion of the appropriate underflow trap subroutine;
- (iv) inclusion of an iteration number limit for any one time step. This was included to avoid excessive use of computer time on slowly converging solutions for any one time step;
- (v) inclusion of a loop to enable more than one example to be computed for each job submission.

A programme listing of the modified Prickett and Lonquist computer programme follows.

| | | | | | | | | | | | | | |
|-----------------------------------|---|-----|---|----|---|-------|---|-------------------|---|---|---|-----------|---|
| | | SFI | | H | | Q | | NODAL VALUES CARD | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | | | | |
| NC | | | | ST | | | | HH | | Q | | NODE CARD | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 |
| NSTEPS | | | | | | DELTA | | | | | | ERROR | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| PARAMETER CARD | | | | | | Q | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| THE UNIVERSITY OF NEW SOUTH WALES | | | | | | | | | | | | | |

**THE UNIVERSITY OF
NEW SOUTH WALES**




Fig. IV-1: Modified input data format.

```

C
C
0001 BASIC AQUIFER SIMULATION PROGRAMME
0002 DIMENSION H(50,50),HO(50,50),SF1(50,50),Q(50,50),T(50,50,2)
C DIMENSION B(50),G(50),DL(50,50)
C
C DEFINE INPUT AND OUTPUT DEVICE NUMBERS
0003 NREAD=1
0004 NPRNT=3
C
C DEFINITION OF VARIABLES
C
C HO(I,J) HEADS AT START OF TIME INCREMENT (I,J)
C H(I,J) HEADS AT END OF TIME INCREMENT (FT)
C SF1(I,J) STORAGE FACTOR FOR ARTESIAN CONDITIONS (FT**2)
C Q(I,J) CONSTANT WITHDRAWAL RATES (FT**3)
C T(I,J,1) AQUIFER TRANSMISSIVITY BETWEEN I,J AND I,J&1
C (FT**2/DAY)
C T(I,J,2) AQUIFER TRANSMISSIVITY BETWEEN I,J AND I&1,J
C (FT**2/DAY)
C AA,BB,CC,DD, COEFFICIENTS IN WATER BALANCE EQUATIONS
C NR NO. OF ROWS IN MODEL
C NC NO. OF COLUMNS IN MODEL
C NSTEPS NO. OF TIME INCREMENTS
C DELTA TIME INCREMENTS
C HH,SJ,QQ,TT DEFAULT VALUES
C I MODEL COLUMN NUMBER
(1) IFY033I COMMENTS DELETED
0005 0001 READ (NREAD,0009) NSTEPS,DELTA,ERROR $1
0006 0009 FORMAT (I10,2F10.0)
0007 IF (NSTEPS.EQ.0) GO TO 9000
C
C READ DEFAULT CARD
C
0008 0001 READ (NREAD,0010) NC,NP,TT,SJ,HH,QQ $1
0009 0010 FORMAT (2I5,4F10.0)
C
C FILL ARRAYS WITH DEFAULT VALUES

```

185.


```

0010      C      DD 0021 I=1,NC
0011      DD 0020 J=1,NR
0012      T(I,J,1)=TT
0013      T(I,J,2)=TT
0014      SF1(I,J)=S1
0015      H(I,J)=HH
0016      HO(I,J)=HH
0017      Q(I,J)=QQ
0018      DL(I,J)=0.0
0019      0020 CONTINUE
0020      0021 CONTINUE
C
C      READ NODE CARDS
C
0021      NCNR=NC*NR
0022      DO 0045 K=1,NCNR
0023      READ (NREAD,0040) I,J
0024      0040  FORMAT (2I5)
0025      IF (I.EQ.0) GO TO 0050
0026      IK=I
0027      JK=J
0028      READ (NREAD,0042) T(IK,JK,1),T(IK,JK,2),SF1(IK,JK),H(IK,JK),Q(IK,J
0029      0042  FORMAT (5F10.0)
0030      0045  CONTINUE
C
C      START OF SIMULATION
C
0031      0050  TIME=0.0
0032      DO 0320 ISTEP=1,NSTEPS
0033      TIME=TIME+DELTA
C
C      PREDICT HEADS FOR NEXT TIME INCREMENTS
C
0034      DO 0071 I=1,NC
0035      DO 0070 J=1,NR
0036      D=H(I,J)-HO(I,J)
0037      HO(I,J)=H(I,J)
0038      F=.0
0039      IF (DL(I,J).EQ.0.0) GO TO 0060
0040      IF (ISTEP.GT.2) F=0/DL(I,J)
0041      IF (F.GT.5.0) F=5.0
0042      IF (F.LT.0.0) F=0.0
0043      0060  DL(I,J)=D
0044      H(I,J)=H(I,J)+D*F
0045      0070  CONTINUE
0046      0071  CONTINUE
C
C      REFINE ESTIMATES OF HEADS BY IADI METHOD

```

\$1

\$1

```

0047      ITER=0
0048      0080 E=0.0
0049      ITER=ITER+1
      C
      C      COLUMN CALCULATIONS
      C
0050      DO 0190 II=1,NC
0051      I=II
0052      IF (MOD(ITER+1,2).EQ.1) I=NC-I+1
0053      DO 0170 J=1,NR
      C
      C      CALCULATE B AND G ARRAYS
      C
0054      AA=0.0
0055      BB=SF1(I,J)/DELTA
0056      CC=0.0
0057      DD=HO(I,J)*BB-Q(I,J)
0058      IF (J-1) 0120,0090,0120
0059      0090 IF (I-1) 0100,0095,0100
0060      0095 BB=BB+T(I,J,1)+T(I,J,2)
0061      CC=CC-T(I,J,1)
0062      DD=DD+H(I+1,J)*T(I,J,2)
0063      B(J)=CC/BB
0064      G(J)=DD/BB
0065      GO TO 0170
0066      0100 IF (I-NC) 0110,0105,0110
0067      0105 BB=BB+T(I,J,1)+T(I-1,J,2)
0068      CC=CC-T(I,J,1)
0069      DD=DD+H(I-1,J)*T(I-1,J,2)
0070      B(J)=CC/BB
0071      G(J)=DD/BB
0072      GO TO 0170
0073      0110 BB=BB+T(I,J,1)+T(I,J,2)+T(I-1,J,2)
0074      CC=CC-T(I,J,1)
0075      DD=DD+H(I-1,J)*T(I-1,J,2)+H(I+1,J)*T(I,J,2)
0076      B(J)=CC/BB
0077      G(J)=DD/BB
0078      GO TO 0170
0079      0120 IF (J-NR) 0150,0125,0150
0080      0125 IF (I-1) 0135,0130,0135
0081      0130 AA=AA-T(I,J-1,1)
0082      BB=BB+T(I,J-1,1)+T(I,J,2)
0083      DD=DD+H(I+1,J)*T(I,J,2)
0084      W=BB-AA*B(J-1)
0085      B(J)=0.0
0086      G(J)=(DD-AA*G(J-1))/W
0087      GO TO 0170
0088      0135 IF (I-NC) 0145,0140,0145
0089      0140 AA=AA-T(I,J-1,1)
0090      BB=BB+T(I,J-1,1)+T(I-1,J,2)
0091      DD=DD+H(I-1,J)*T(I-1,J,2)

```

```

0092 W=BB-AA*B(J-1)
0093 B(J)=0.0
0094 G(J)=(UD-AA*G(J-1))/W
0095 GO TO 0170
0096 AA=AA-T(I,I,J-1,1)
0097 BB=BB+T(I,I,J-1,1)+T(I-1,J,2)+T(I,J,2)
0098 DD=DD+H(I-1,J)*T(I-1,J,2)+H(I+1,J)*T(I,J,2)
0099 W=BB-AA*B(J-1)
0100 B(J)=0.0
0101 G(J)=(DD-AA*G(J-1))/W
0102 GO TO 0170
0103 IF (I-1) 0157,0155,0157
0104 AA=AA-T(I,I,J-1,1)
0105 BB=BB+T(I,I,J-1,1)+T(I,J,1)+T(I,J,2)
0106 CC=CC-T(I,I,J,1)
0107 DD=DD+H(I+1,J)*T(I,J,2)
0108 W=BB-AA*B(J-1)
0109 B(J)=CC/W
0110 G(J)=(DD-AA*G(J-1))/W
0111 GO TO 0170
0112 IF (I-NC) 0165,0160,0165
0113 AA=AA-T(I,J-1,1)
0114 BB=BB+T(I,J-1,1)+T(I,J,1)+T(I-1,J,2)
0115 CC=CC-T(I,J,1)
0116 DD=DD+H(I-1,J)*T(I-1,J,2)
0117 W=BB-AA*B(J-1)
0118 B(J)=CC/W
0119 G(J)=(DD-AA*G(J-1))/W
0120 GO TO 0170
0121 AA=AA-T(I,J-1,1)
0122 BB=BB+T(I,J-1,1)+T(I,J,1)+T(I-1,J,2)
0123 CC=CC-T(I,J,1)
0124 DD=DD+H(I-1,J)*T(I-1,J,2)
0125 W=BB-AA*B(J-1)
0126 B(J)=CC/W
0127 G(J)=(DD-AA*G(J-1))/W
0128 CONTINUE
C
C
C
RE-ESTIMATE HEADS
E=E+ABS(H(I,NR)-G(NR))
H(I,NR)=G(NR)
N=NR-1
HA=G(N)-R(N)*H(I,N+1)
E=E+ABS(HA-H(I,N))
H(I,N)=HA
N=N-1
IF (N) 0190,0190,0180
0130 CONTINUE
C
0129 E=E+ABS(H(I,NR)-G(NR))
0130 H(I,NR)=G(NR)
0131 N=NR-1
0132 HA=G(N)-R(N)*H(I,N+1)
0133 E=E+ABS(HA-H(I,N))
0134 H(I,N)=HA
0135 N=N-1
0136 IF (N) 0190,0190,0180
0137 CONTINUE
C

```

C
C

ROW CALCULATIONS

```
0138 DO 0300 JJ=1, NR
0139 J=JJ
0140 IF (MOD(ISTEP+ITER, 2).EQ.1) J=NR-J+1
0141 DO 0280 I=1, NC
0142 AA=0.0
0143 BB=SF1(I, J)/DELTA
0144 CC=0.0
0145 DD=HQ(I, J)*BB-Q(I, J)
0146 IF (J-1) 0220, 0200, 0220
0147 IF (I-1) 0210, 0205, 0210
0148 0200 BB=BB+T(I, J, 1)+T(I, J, 2)
0149 0205 CC=CC-T(I, J, 2)
0150 DD=DD+H(I, J+1)*T(I, J, 1)
0151 B(I)=CC/BB
0152 G(I)=DD/BB
0153 GO TO 0280
0154 0210 IF (I-NC) 0215, 0212, 0215
0155 0212 AA=AA-T(I-1, J, 2)
0156 BB=BB+T(I, J, 1)+T(I-1, J, 2)
0157 DD=DD+H(I, J+1)*T(I, J, 1)
0158 W=BB-AA*B(I-1)
0159 B(I)=G.0
0160 G(I)=(DD-AA*G(I-1))/W
0161 GO TO 0280
0162 0215 AA=AA-T(I-1, J, 2)
0163 BB=BB+T(I, J, 1)+T(I-1, J, 2)+T(I, J, 2)
0164 CC=CC-T(I, J, 2)
0165 DD=DD+H(I, J+1)*T(I, J, 1)
0166 W=BB-AA*B(I-1)
0167 B(I)=CC/W
0168 G(I)=(DD-AA*G(I-1))/W
0169 GO TO 0280
0170 0220 IF (J-NR) 0240, 0225, 0240
0171 0225 IF (I-1) 0230, 0227, 0230
0172 0227 BB=BB+T(I, J-1, 1)+T(I, J, 2)
0173 CC=CC-T(I, J, 2)
0174 DD=DD+H(I, J-1)*T(I, J-1, 1)
0175 B(I)=CC/BB
0176 G(I)=DD/BB
0177 GO TO 0280
0178 0230 IF (I-NC) 0235, 0232, 0235
0179 0232 AA=AA-T(I-1, J, 2)
0180 BB=BB+T(I, J-1, 1)+T(I-1, J, 2)
0181 DD=DD+H(I, J-1)*T(I, J-1, 1)
0182 W=BB-AA*B(I-1)
0183 B(I)=CC/W
0184 G(I)=(DD-AA*G(I-1))/W
0185 GO TO 0280
```

```

0186      0235 AA=AA-T(I-1,J,2)
0187      BB=BB+T(I,J-1,1)+T(I-1,J,2)+T(I,J,2)
0188      CC=CC-T(I,J,2)
0189      DD=DD+H(I,J-1)*T(I,J-1,1)
0190      W=BB-AA*B(I-1)
0191      B(I)=CC/W
0192      G(I)=(DD-AA*G(I-1))/W
0193      GO TO 0280
0194      0240 IF (I-1) 0250,0245,0250
0195      0245 BB=BB+T(I,J-1,1)+T(I,J,1)+T(I,J,2)
0196      CC=CC-T(I,J,2)
0197      DD=DD+H(I,J-1)*T(I,J-1,1)+H(I,J+1)*T(I,J,1)
0198      B(I)=CC/BB
0199      G(I)=DD/BB
0200      GO TO 0280
0201      0250 IF (I-NC) 0260,0255,0260
0202      0255 AA=AA-T(I-1,J,2)
0203      BB=BB+T(I,J-1,1)+T(I,J,1)+T(I-1,J,2)
0204      DD=DD+H(I,J-1)*T(I,J-1,1)+H(I,J+1)*T(I,J,1)
0205      W=BB-AA*B(I-1)
0206      B(I)=CC/W
0207      G(I)=(DD-AA*G(I-1))/W
0208      GO TO 0280
0209      0260 AA=AA-T(I-1,J,2)
0210      BB=BB+T(I,J-1,1)+T(I,J,1)+T(I-1,J,2)+T(I,J,2)
0211      CC=CC-T(I,J,2)
0212      DD=DD+H(I,J-1)*T(I,J-1,1)+H(I,J+1)*T(I,J,1)
0213      W=BB-AA*B(I-1)
0214      B(I)=CC/W
0215      G(I)=(DD-AA*G(I-1))/W
0216      0280 CONTINUE

C
C      RE--ESTIMATE HEADS
C
0217      E=E+ABS(H(NC,J)-G(NC))
0218      H(NC,J)=G(NC)
0219      N=NC-1
0220      0290 HA=G(N)-B(N)*H(N+1,J)
0221      F=E+ABS(H(N,J)-HA)
0222      H(N,J)=HA
0223      N=N-1
0224      IF (N) 0300,0300,0290
0225      0300 CONTINUE
0226      IF (ITER-10) 0305,0307,0305
0227      0305 IF (F.GT.EPROR) GO TO 0080

C
C      PRINT RESULTS
C
0228      0307 WRITE (NPRNT,0310) TIME,F,ITER
0229      0310 FORMAT (1H),6H TIME#,F6.2///I20.7,I5//)

```

E90.

```
0230      DELTA=DELTA*.2
0231      DO 0318 J=1,NR
0232      WRITE (NPRNT,0312) J
0233      0312  FORMAT (I5/)
0234      WRITE (NPRNT,0317) (H(I,J),I=1,NC)
0235      0317  FORMAT (10X,10F10.4/)
0236      0318  CONTINUE
0237      0320  CONTINUE
C
0238      GO TO 0001
0239      9000  STOP
0240      END
```

APPENDIX V

REGIONAL FLOW MODEL

IMAGE WELL SYSTEM DIGITAL COMPUTER PROGRAMME

This programme was developed as an alternative regional flow model for Site A (Gumly Gumly Island) when difficulties were experienced in eliminating the effects of the end row nodes of the Prickett and Lonquist programme, for values of time greater than 1000 minutes.

The programme is based on the following assumptions:-

- (i) The aquifer is (a) fully confined
(b) homogeneous and isotropic
- (ii) The real or discharge well
 - (a) co-ordinates are set at the origin of co-ordinates
 - (b) penetrates and receives water from the entire thickness of the aquifer
 - (c) diameter is infinitesimally small.
- (iii) The transmissivity T is constant at all times.
- (iv) Water removed from storage is discharged instantaneously with decline in head.
- (v) The observation wells penetrate the 'entire thickness of the aquifer.

It requires the knowledge of the following parameters:-

- (i) Transmissivity TT
- (ii) Storage coefficient S
- (iii) Discharge Q
- (iv) Number of image wells (NI)
- (v) Co-ordinates of each image well (X, Y)
- (vi) Co-ordinates of each observation well (XX, YY)

A listing of the programme and an example of the input data formats follows.


```

$PROGRAM W.SWAN,TIME=10,PAGES=500,KP=26
C MAIN PROGRAMME FOR IMAGE WELL SYSTEM SIMULATION
1
2 DIMENSION X(50),Y(50),T(50),RD(50)
3 DIMENSION D(50)
4 DOUBLE PRECISION U
5
C
C DEFINE INPUT AND OUTPUT DEVICE NUMBERS
NREAD=1
NPRNT=3
C
C DEFINITION OF SYMBOLS
C DISCHARGE
S STORAGE COEFFICIENT
T TIME
TT TRANSMISSIVITY
X X COORDINATE OF IMAGE WELL
Y Y COORDINATE OF IMAGE WELL
XX X COORDINATE OF OBSERVATION WELL
YY Y COORDINATE OF OBSERVATION WELL
NI NUMBER OF IMAGE WELLS
NT NUMBER OF TIME VALUES
TURN OFF UNDERFLOW TRAP
6 CALL TRAPS (0,1,2000000000)
7 0001 READ (NREAD,0005) NI,NT
8 0005 FORMAT (2I5<
9 IF (NI.EQ.0) GO TO 9000
10 WRITE (NPRNT,0006) NI,NT
11 0006 FORMAT (2I5/<
12 IF (NI.EQ.1) GO TO 5000
C
13 DO 0100 K=1,NI
14 READ (NREAD,0010) X(K),Y(K)
15 0010 FORMAT (2F10.0<
16 WRITE (NPRNT,0011) X(K),Y(K)

```

E93.

\$1
\$NT

```

17 0011 FORMAT (2F10.0/<
18 0100 CONTINUE
C
19 READ (NREAD,0150) (T(J),J=1,NT)
20 0150 FORMAT (4F10.0<
21 WRITE (NPRNT,0151) (T(J),J=1,NT)
22 0151 FORMAT (8F10.0/<
C
23 0200 READ (NREAD,0250) XX,YY
24 0250 FORMAT (2F10.0<
25 IF (XX.EC.0.0) GO TO 0001
26 READ (NREAD,0270) TT,S,Q
27 0270 FORMAT (F10.2,E15.6,F10.1<
C
C CALCULATE RADIAL DISTANCES
C
28 DO 0300 K=1,NI
29 A=(XX-X(K))**2
30 B=(YY-Y(K))**2
31 RD(K)=SQRT(A+B)
32 0300 CONTINUE
C
33 WRITE (NPRNT,0305)
34 0305 FORMAT (1H1<
35 READ (NREAD,0310)
36 0310 FORMAT (10X,49H...../<
37 WRITE (NPRNT,0310)
38 WRITE (NPRNT,0311) XX,YY,TT,S,Q
39 0311 FORMAT (3F10.2,E15.6,F10.2/<
C
40 AW=XX**2
41 BW=YY**2
42 RPW=SQRT(AW+BW)
C
43 DO 1500 J=1,NT
44 SS=0.0
45 U=RPW**2*S/(4.0*TT*T(J))
46 W=W(U)
47 SS=(Q*W)/(4.0*3.1415*TT)
48 DO 1000 K=1,NI
49 U=(S*(RD(K))**2)/(4.0*TT*T(J))
50 WY=W(U)
51 D(K)=(Q*WY)/(4.0*3.1415*TT)
52 SS=SS+D(K)
53 1000 CONTINUE
54 WRITE (NPRNT,1200) T(J),SS
55 1200 FORMAT (10X,F10.1,10X,E16.6/<
56 1500 CONTINUE
57 GO TO 0200

```

\$NT/4

\$1

\$1

\$A&BL

E94.

```

C      ONE IMAGE WELL ONLY
C
58    5000 READ (NREAD,5010) XIW,YIW          $1
59    5010 FORMAT (2F10.0<
60    WRITE (NPRNT,5011) XIW,YIW
61    5011 FORMAT (2F10.0/<
C
62    READ (NREAD,5150) (T(J),J=1,NT)      $NT/4
63    5150 FORMAT (4F10.0<
64    WRITE (NPRNT,5151) (T(J),J=1,NT)
65    5151 FORMAT (8F10.0/<
C
66    5200 READ (NREAD,5250) XX,YY
67    5250 FORMAT (2F10.0<
68    XY=ABS(XX)-ABS(YY)
69    IF (XY) 5251,0001,5251
70    5251 READ (NREAD,5270) TT,S,Q        $1
71    5270 FORMAT (F10.2,E15.6,F10.1<
C
72    A=(XX-XIW)**2
73    B=(YY-YIW)**2
74    RRD=SQRT(A+B)
75    WRITE (NPRNT,5305)
76    5305 FORMAT (1H1<
77    READ (NREAD,5310)
78    5310 FORMAT (10X,49H...../ < $A&BL
79    WRITE (NPRNT,5311) XX,YY,TT,S,Q
80    5311 FORMAT (2F10.2,E15.6,F10.2/<
C
82    AW=XX**2
83    BW=YY**2
84    RPW=SQRT(AW+BW)
C
85    DO 6000 J=1,NT
86    SS=0.0
87    U=RPW**2*S/(4.0*TT*T(J))
88    WW=W(U)
89    SS=(Q*WW)/(4.0*3.1415*TT)
90    WY=W(U)
91    DD=(Q*WY)/(4.0*3.1415*TT)
92    SS=SS+DD
C
93    WRITE (NPRNT,6200) T(J),SS
94    6200 FORMAT (10X,F10.1,10X,E16.6/<
95    6000 CONTINUE
96    GO TO 5200
97    9000 WRITE (NPRNT,9100)
98    9100 FORMAT (1H1<
99    STOP
100   END

```

```

101      FUNCTION W(U)
          C
          C
          WELL FUNCTION COMPUTATION
          DOUBLE PRECISION U,DLOG,WC
102      WC=-0.5772-DLOG(U)
103      WW=WC
104      TERM=1.0
105      J=1
106      DO 10 I=1,30
107      TERM=(TERM*U)/I
108      IF (J.EQ.0) GO TO 20
109      WW=WW+TERM/I
110      J=0
111      GO TO 30
112      20 CONTINUE
113      WW=WW-TERM/I
114      J=1
115      30 CONTINUE
116      EPSI=(WW-WC)/WW
117      IF (ABS(EPSI).LE.0.01) GO TO 40
118      WC=WW
119      10 CONTINUE
120      40 CONTINUE
121      W=WW
122      RETURN
123      END
124

```

List of References

1. Boulton, N.S. - "Unsteady Radial Flow to a Pumped Well allowing for Delayed Yield and Storage", I.A.S.H. General Assembly of Rome, 2.37, 472-77, (1954).
2. Boulton, N.S. - "Analysis of Data from Non-equilibrium Pumping Tests allowing for Delayed Yield and Storage" I.C.E. (U.K.) Proc., 26, 469-482, (1963).
3. Cooley, R.L. - "A Finite Difference Method for Unsteady Flow in Variably Saturated Porous Media: Application to a Single Pumping Well", Water Resources Research, 7, 6, 1607-1625, (1971).
4. Cooper, H.H., Jacob C.E. - "A Generalised Graphical Method for Evaluating Formation Constants and Summarising Well-Field History", 27, 526-534, (1946).
5. Ferris, J.G. et al, - "Theory of Aquifer Tests". Geol. Survey Water Supply Paper 1536-E, Washington, (1962).
6. Hantush, M.S. - "Modifications of the Theory of Leaky Aquifers", Jour. of Geophysical Research, 65, 11, 3713-25, (1960).
7. Hantush, M.S. - "Hydraulics of Wells", Advances in Hydroscience, Ed. Ven te Chow, Academic Press, New York, 1, (1964).
8. Jacob, C.E., - "Drawdown Test to determine Effective Radius of Artesian Well", A.S.C.E. Proc., 79, 5, (1946).
9. Neuman, S.P., Witherspoon, P.A. - "Transient Flow of Ground Water to Wells in Multiaquifer Systems", Dept. of Civ. Engg. Inst. of Transportation and Traffic Engg. Univ. of California, Berkely, Publ. No. 69-1, (1969).
10. Prickett, T.A. - "Type-Curve Solution to Aquifer Tests under Water Table Conditions", Ground Water, 3, 3, 5-14, (1965).
11. Prickett, T.A., Lonquist, C.G., - "Selected Digital Computer Techniques for Groundwater Resource Evaluation", Illinois State Water Survey, Urbana, Illinois, Bull. 55, (1971).
12. Stallman, R.W. - "Aquifer Test Design, Observation and Data Analyses", in "Addenda to S.W. Lohman's Manual on Groundwater Hydraulics", Australian Groundwater Resources Council, 1970 Groundwater School, Adelaide, South Australia, 18-29 May, (1970).

List of References (cont'd.)

13. Theis, C. V. - "The Relation between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well using Ground Water Storage", Transactions A.G.U., Vol. 16, 519-524, (1935).

DRANDOWN AT OBSERVATION WELL 30032

TITLE CARD

0.380000E-03 128.2

PARAMETER CARD

2600.0 3120.0 4320.0

FIRST OBSERVATION WELL COORDINATES

TIME CARD 2

TIME CARD 1

SECOND IMAGE WELL COORDINATE CARD

FIRST IMAGE WELL COORDINATE CARD

PARAMETER CARD

THE UNIVERSITY OF NEW SOUTH WALES



Figure V-1: Input data format.