



July 21, 1995

Valley Water Services
29837 Simpson Road, R.R. 15
ABBOTSFORD, B.C. V4X 1V9

Attention: Mr. Wayne Rinke

Subject: Pump Test of Well TW-1 at Norgard Developments in Maple Ridge

Dear Sir:

1.0 INTRODUCTION

This letter is further to telephone discussions between you (Rinke) and Ann Badry, P. Geo., Hydrogeologist/Manager of Pacific Hydrology Consultants Ltd. (PHCL) and also with Ed Livingston, P. Eng., also of PHCL about the pump test carried out by Valley Water Services (VWS) on a well at the Norgard Development Subdivision in Maple Ridge. We understand that the well is to serve as a source for a single residence.

The data which you sent to us show that the 150 mm (6") well was constructed in July 1995 by Field Drilling Contractors Ltd. The driller's litholog is as follows:

Driller's litholog:

| | |
|-------------------------------|------------------------------|
| 0.0 - 0.9 m (0 - 3 ft) | overburden |
| 0.9 - 48.2 m (3 - 15 ft) | sandstone bedrock |
| 48.2 - 49.4 m (15 - 162 ft) | loose bedrock, water-bearing |
| 49.4 - 65.5 m (162 - 205 ft) | sandstone. |

Static water level on July 13 was 20.79 m (68.2 ft).

The well is lined from surface with:

48.8 m (160 ft) of 112 mm (4½") diameter blank PVC lines
12.2 m (40 ft) of 112 mm (4½") PVC lines with 0.5 mm (0.020") slots
6.1 m (20 ft) of 112 mm (4½") PVC blank pipe to support the liner

There is a plug at the bottom of the slotted section; this does not prevent water from moving up to the slotted section.

The well was pump tested by Valley Water Services on July 13 for 450 minutes and the recovery was observed for one hour after pumping stopped. The data from the test along with data plots are included with this letter.



MEMBER

The data show that the test was carried out at several decreasing rates of flow, the rate during the last 350 minutes of the test being at an average slightly below 10 USgpm with a short period of reduced rate between 300 and 350 minutes during which the water level rose about 6.1 m (20 ft). Except for the short rise noted above, the drawdown was more or less constant at about 20.7 m (68 ft) for the last 400 minutes of the 450 minute test. We note that the data sheets show that the water was cloudy for most of the test but was clear toward the end. This is not surprising in a new well in the sedimentary rocks at Maple Ridge. Experience shows that continued pumping during normal water will eventually result in elimination of sediment in the water.

2.0 CONCLUSIONS

The pump test data and plots show the following:

1. The pump test was carried out properly and is sufficient to indicate the capacity of the well to serve a single residence.
2. The long term capacity of this well for domestic use is estimated to be in the range 0.38 to 0.57 //sec (6 to 9 USgpm) which is more than adequate for single domestic service.
3. The well is properly constructed with a PVC liner which is large enough to accommodate a pump suitable for domestic service. The 6.1 m slotted section is sufficient to admit water to the well.

3.0 RECOMMENDATIONS

When a submersible pump is installed, place a 3/4" PVC bell joint pipe to permit measurements of static and pumping water levels. This is usually done using PVC electrical conduit taped to the drop pipe of the pump with the bottom at the top of the pump. If a pitless adaptor is used, the measuring pipe should be brought up close to the cap for ease of measurements with an electric water level indicator.

Yours truly,
PACIFIC HYDROLOGY CONSULTANTS LTD.

Ed Livingston
Ed Livingston, P. Eng.
Associate Consultant



Enclosure

APPENDIX "E"
CERTIFICATE OF WELL WATER QUANTITY

Corporation of the District of Maple Ridge
11995 Haney Place
Maple Ridge, B.C.
V2X 6A9

Attention: Director of Inspection Services

I, _____, a Professional Engineer under the
"Engineering Profession Act" of the Province of British Columbia, acting on behalf of my
client,

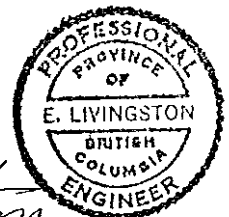
Name: ~~Mr. J. Grant~~ Mrs. J. Grant / c/o NORGER DEV. LTD.
Address: 25575 - 100 Ave.
Legal Description: Lt. 24 Bl. 1208 D1.432 Sec 7wp.12 G.P.1

HEREBY CERTIFY AS FOLLOWS:

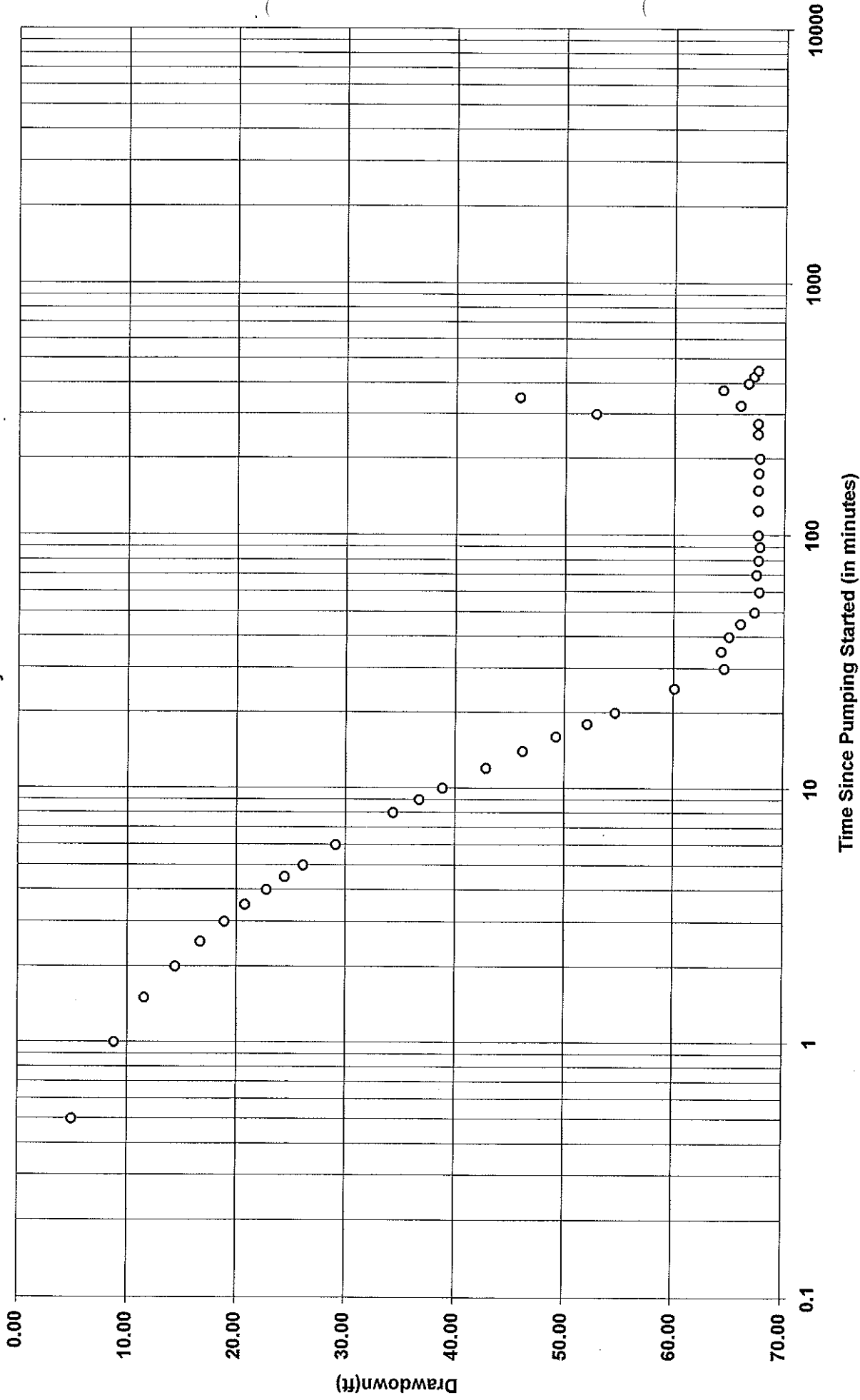
1. A site plan showing the location of the well is attached.
2. A water well drilling log is attached.
3. A water well pumping test record including date, time and duration of pumping test is attached.
4. Draw down and recover data is attached.
5. That based on the said tests, numbers 2 to 4 inclusive, and my knowledge of the said lands, I
am
of the opinion this well is capable of yielding 500 gallons of water per day on a year round
basis.
6. If applicable, a letter from the installer of the water purification system giving date of
installation; type of equipment and all pertinent data is attached.

DATED this 21 day of July, 19 95.

E. Livingston
Professional Engineer



VALLEY WATER SERVICES
Time-Drawdown Plot For Pumping Test of
NORGARD DEVELOPMENTS TW-1
July 13/95

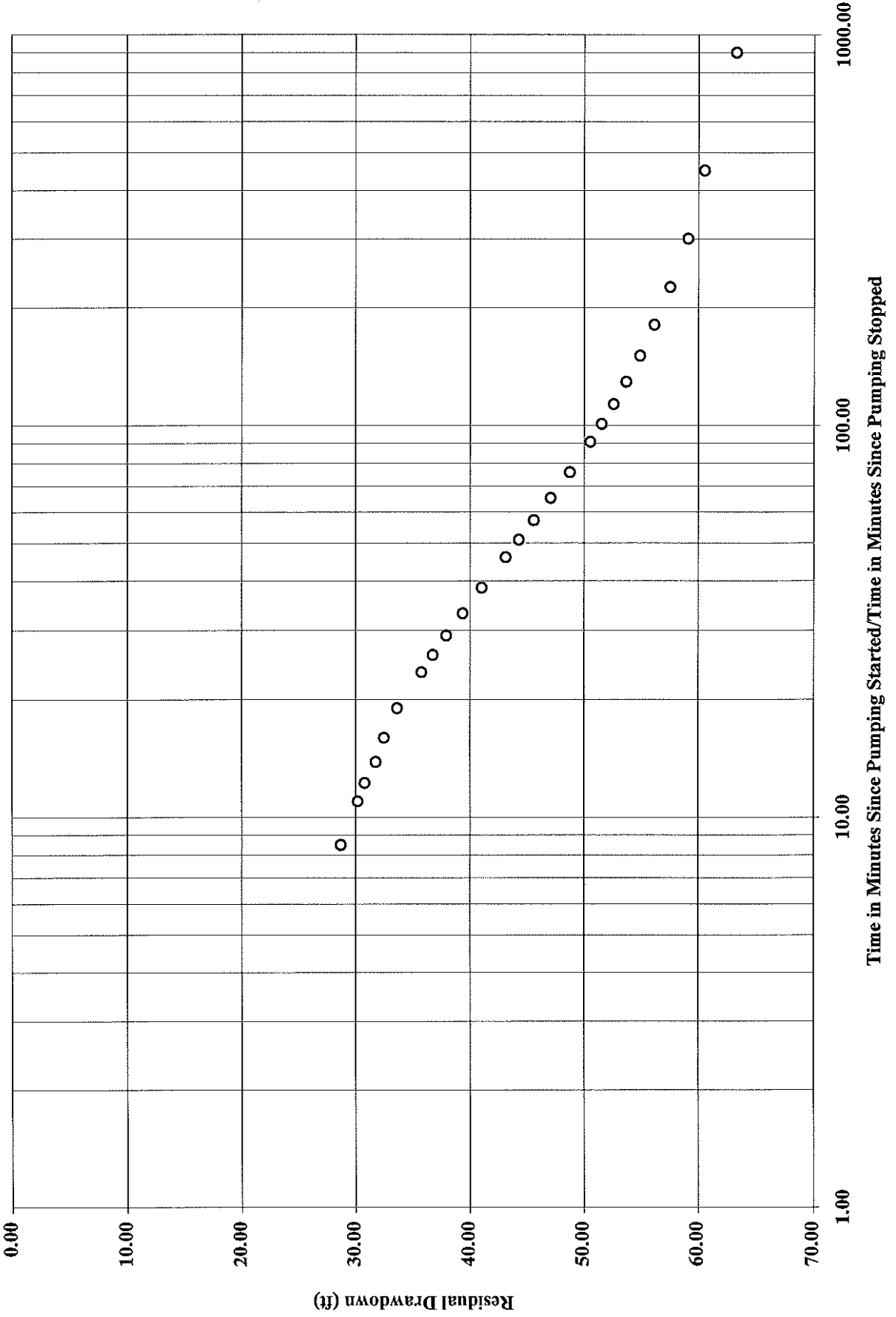


VALLEY WATER SERVICES

| RECOVERY DATA | | | | | | | |
|--------------------------------------|----------|-------------------------------------|---------------------------|---------------------|--------|----------------------|----------|
| START DATE: July 13/95 | | FINISH DATE: July 13/95 | | | | | |
| PROJECT: Norgard Developments | | | | WELL #: TW-1 | | | |
| LOCATION: 25575 100th Ave. | | REF#: NORDEV1R | | | | | |
| | | Maple Ridge B.C. | | | | | |
| DATUM POINT: T.O.C. | | ELEVATION OF DATUM POINT: 3' | | | | | |
| S.W.L.: 68.20 | | METERS: | | | | | |
| | | FEET: X | | | | | |
| START TIME: 21:40 | | FINISH TIME: 22:40 | | | | | |
| | | ELAPSED TIME: 450 | | | | | |
| DATE | TIME | E.T. START t (min) | E.T. STOP t ' (min) | RATIO (t/t') | D.T.W. | RES. DRAW DOWN | COMMENTS |
| 13-May | 21:40:00 | 450.00 | 0 | | 135.80 | 67.60 | |
| | 21:40:30 | 450.50 | 0.50 | 901.00 | 131.46 | 63.26 | |
| | 21:41:00 | 451.00 | 1 | 451.00 | 128.72 | 60.52 | |
| | 21:41:30 | 451.50 | 1.50 | 301.00 | 127.28 | 59.08 | |
| | 21:42:00 | 452.00 | 2 | 226.00 | 125.72 | 57.52 | |
| | 21:42:30 | 452.50 | 2.50 | 181.00 | 124.36 | 56.16 | |
| | 21:43:00 | 453.00 | 3 | 151.00 | 123.10 | 54.90 | |
| | 21:43:30 | 453.50 | 3.50 | 129.57 | 121.89 | 53.69 | |
| | 21:44:00 | 454.00 | 4 | 113.50 | 120.79 | 52.59 | |
| | 21:44:30 | 454.50 | 4.50 | 101.00 | 119.76 | 51.56 | |
| | 21:45:00 | 455.00 | 5 | 91.00 | 118.74 | 50.54 | |
| | 21:46 | 456 | 6 | 76.00 | 116.95 | 48.75 | |
| | 21:47 | 457 | 7 | 65.29 | 115.28 | 47.08 | |
| | 21:48 | 458 | 8 | 57.25 | 113.80 | 45.60 | |
| | 21:49 | 459 | 9 | 51.00 | 112.47 | 44.27 | |
| | 21:50 | 460 | 10 | 46.00 | 111.30 | 43.10 | |
| | 21:52 | 462 | 12 | 38.50 | 109.23 | 41.03 | |
| | 21:54 | 464 | 14 | 33.14 | 107.55 | 39.35 | |
| | 21:56 | 466 | 16 | 29.13 | 106.10 | 37.90 | |
| | 21:58 | 468 | 18 | 26.00 | 104.94 | 36.74 | |
| | 22:00 | 470 | 20 | 23.50 | 103.96 | 35.76 | |
| | 22:05 | 475 | 25 | 19.00 | 101.84 | 33.64 | |
| | 22:10 | 480 | 30 | 16.00 | 100.69 | 32.49 | |
| | 22:15 | 485 | 35 | 13.86 | 99.97 | 31.77 | |
| | 22:20 | 490 | 40 | 12.25 | 99.00 | 30.80 | |
| | 22:25 | 495 | 45 | 11.00 | 98.38 | 30.18 | |
| | 22:40 | 510 | 60 | 8.50 | 96.91 | 28.71 | |

VALLEY WATER SERVICES

Time-Recovery Plot For Pumping Test of
NORGARD DEVELOPMENTS TW-1
JULY 13/95



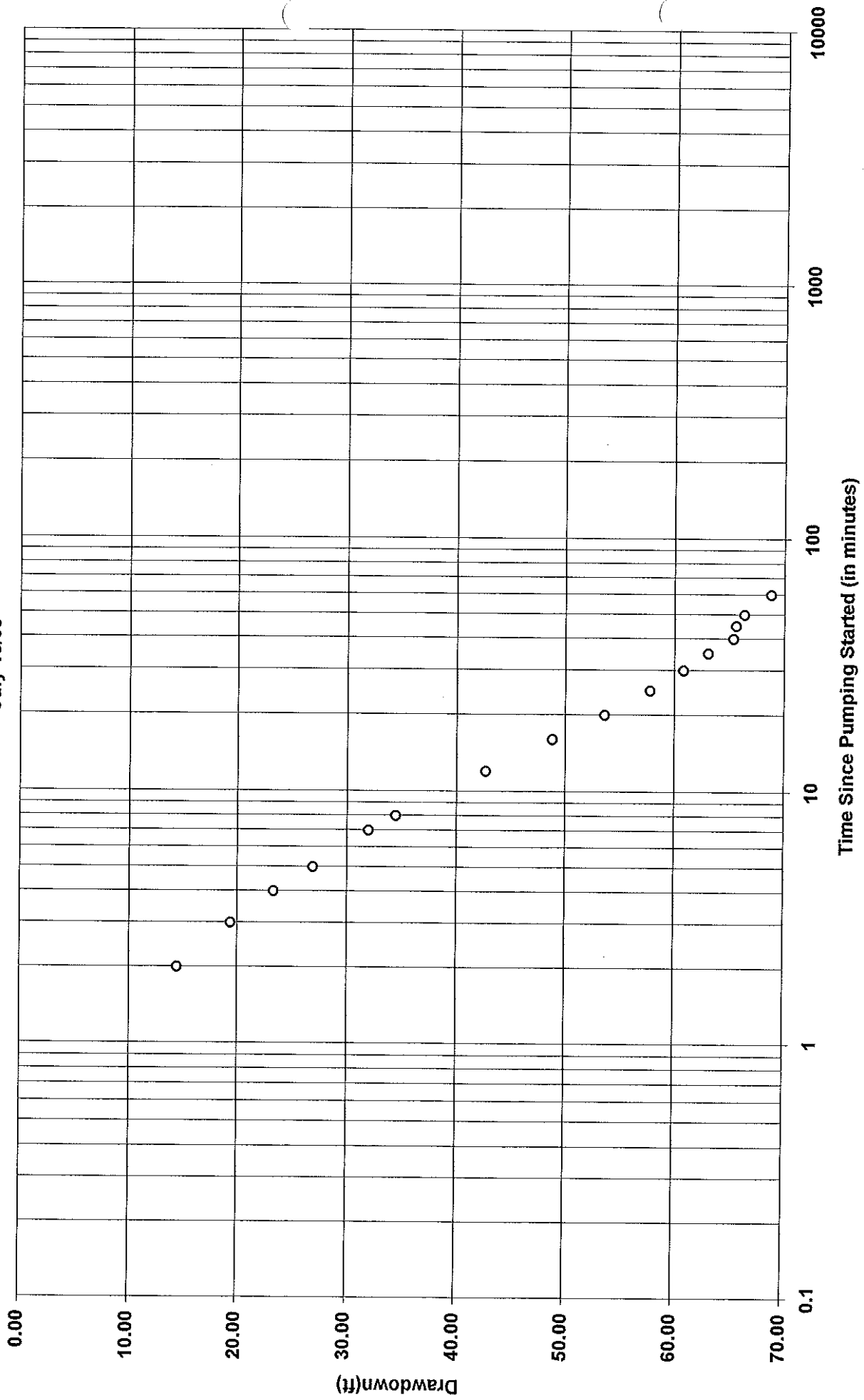
VALLEY WATER SERVICES

| DRAWDOWN | | | | | | | |
|-------------------------------------|-------|-------------------------------------|----------|------------------------|------|---------------|--------------------------|
| START DATE: July 13/95 | | FINISH DATE: July 13/95 | | | | | |
| PROJECT: Norgard Development | | | | WELL#: T-W-1 | | | |
| LOCATION: 25575 100th Ave | | REF. #: NORDEV1D | | | | | |
| Maple Ridge, B.C. | | | | | | | |
| DATUM POINT: T.O.C. | | ELEVATION OF DATUM POINT: 3' | | | | | |
| S.W.L.: 68.20 | | METERS: | | PUMP USED: 1 HP | | | |
| | | FEET: | | | | | |
| START TIME: 14:10 | | FINISH TIME: 9:15 | | | | | |
| DATE | TIME | E.T. | D. to W. | DRAW DOWN | ORIF | RATE USGPM | COMMENTS |
| 13-Jul | 16:40 | 150 | 135.85 | 67.65 | 30 | 10.50 | |
| | 17:05 | 175 | 135.88 | 67.68 | 32 | 9.84 | |
| | 17:30 | 200 | 135.94 | 67.74 | 32 | 9.84 | |
| | 18:20 | 250 | 135.80 | 67.60 | 32 | 9.84 | |
| | 18:45 | 275 | 135.80 | 67.60 | 33 | 9.55 | VERY CLOUDY |
| | 19:10 | 300 | 121.00 | 52.80 | 55 | 5.73 | CUT RATE |
| | 19:35 | 325 | 134.20 | 66.00 | 38 | 8.29 | INCREASED RATE |
| | 20:00 | 350 | 114.00 | 45.80 | 68 | 4.63 | CUT RATE |
| | 20:25 | 375 | 132.64 | 64.44 | 37 | 8.51 | INCREASED RATE |
| | 20:50 | 400 | 134.91 | 66.71 | 34 | 9.26 | WATER CLEARIN |
| | 21:15 | 425 | 135.43 | 67.23 | 32 | 9.84 | |
| | 21:40 | 450 | 135.80 | 67.60 | 32 | 9.84 | TOOK SAMPLES PUMP OFF |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

VALLEY WATER SERVICES

| DRAWDOWN | | | | | | | |
|---|----------|-------------------------------------|----------|------------------------|-----|---------------|-------------|
| START DATE: July 13/95 | | FINISH DATE: July 13/95 | | | | | |
| PROJECT: Norgard Development | | | | WELL#: T-W-1 | | | |
| LOCATION: 25575 100th Ave Maple Ridge, B.C. | | | | REF#: NORDEV1D | | | |
| DATUM POINT: T.O.C. | | ELEVATION OF DATUM POINT: 3' | | | | | |
| S.W.L.: 68.20 | | METERS: | | PUMP USED: 1 HP | | | |
| | | FEET: | | | | | |
| START TIME: 14:10 | | FINISH TIME: 21:40 | | | | | |
| DATE | TIME | E.T. | D. to W. | DRAW DOWN | SEC | RATE USGPM | COMMENTS |
| 13-Jul | 14:10:00 | 0 | 68.20 | 0.00 | | | |
| | 14:10:30 | 0.5 | 73.20 | 5.00 | | | |
| | 14:11:00 | 1 | 77.06 | 8.86 | | | |
| | 14:11:30 | 1.5 | 79.79 | 11.59 | | | |
| | 14:12:00 | 2 | 82.61 | 14.41 | | | |
| | 14:12:30 | 2.5 | 84.94 | 16.74 | | | |
| | 14:13:00 | 3 | 87.14 | 18.94 | | | |
| | 14:13:30 | 3.5 | 88.98 | 20.78 | | | |
| | 14:14:00 | 4 | 90.99 | 22.79 | | | |
| | 14:14:30 | 4.5 | 92.66 | 24.46 | | | |
| | 14:15 | 5 | 94.36 | 26.16 | | | |
| | 14:16 | 6 | 97.35 | 29.15 | 17 | 18.53 | VERY CLOUDY |
| | 14:18 | 8 | 102.58 | 34.38 | | | |
| | 14:19 | 9 | 104.94 | 36.74 | | | |
| | 14:20 | 10 | 107.07 | 38.87 | | | |
| | 14:22 | 12 | 111.00 | 42.80 | | | |
| | 14:24 | 14 | 114.38 | 46.18 | 19 | 16.58 | |
| | 14:26 | 16 | 117.46 | 49.26 | | | |
| | 14:28 | 18 | 120.30 | 52.10 | | | |
| | 14:30 | 20 | 122.89 | 54.69 | | | |
| | 14:35 | 25 | 128.33 | 60.13 | 19 | 16.58 | VERY CLOUDY |
| | 14:40 | 30 | 132.86 | 64.66 | 23 | 13.70 | |
| | 14:45 | 35 | 132.56 | 64.36 | | | |
| | 14:50 | 40 | 133.26 | 65.06 | 23 | 13.70 | |
| | 14:55 | 45 | 134.29 | 66.09 | 23 | 13.70 | |
| | 15:00 | 50 | 135.56 | 67.36 | 24 | 13.13 | |
| | 15:10 | 60 | 135.97 | 67.77 | 26 | 12.12 | |
| | 15:20 | 70 | 135.70 | 67.50 | 26 | 12.12 | |
| | 15:30 | 80 | 135.87 | 67.67 | 27 | 11.67 | |
| | 15:40 | 90 | 135.98 | 67.78 | 28 | 11.25 | |
| | 15:50 | 100 | 135.85 | 67.65 | 28 | 11.25 | |
| | 16:15 | 125 | 135.84 | 67.64 | 29 | 10.86 | |

VALLEY WATER SERVICES
Time-Drawdown Plot For Pumping Test of
NORGARD DEVELOPMENTS TW-1B
July 13/95



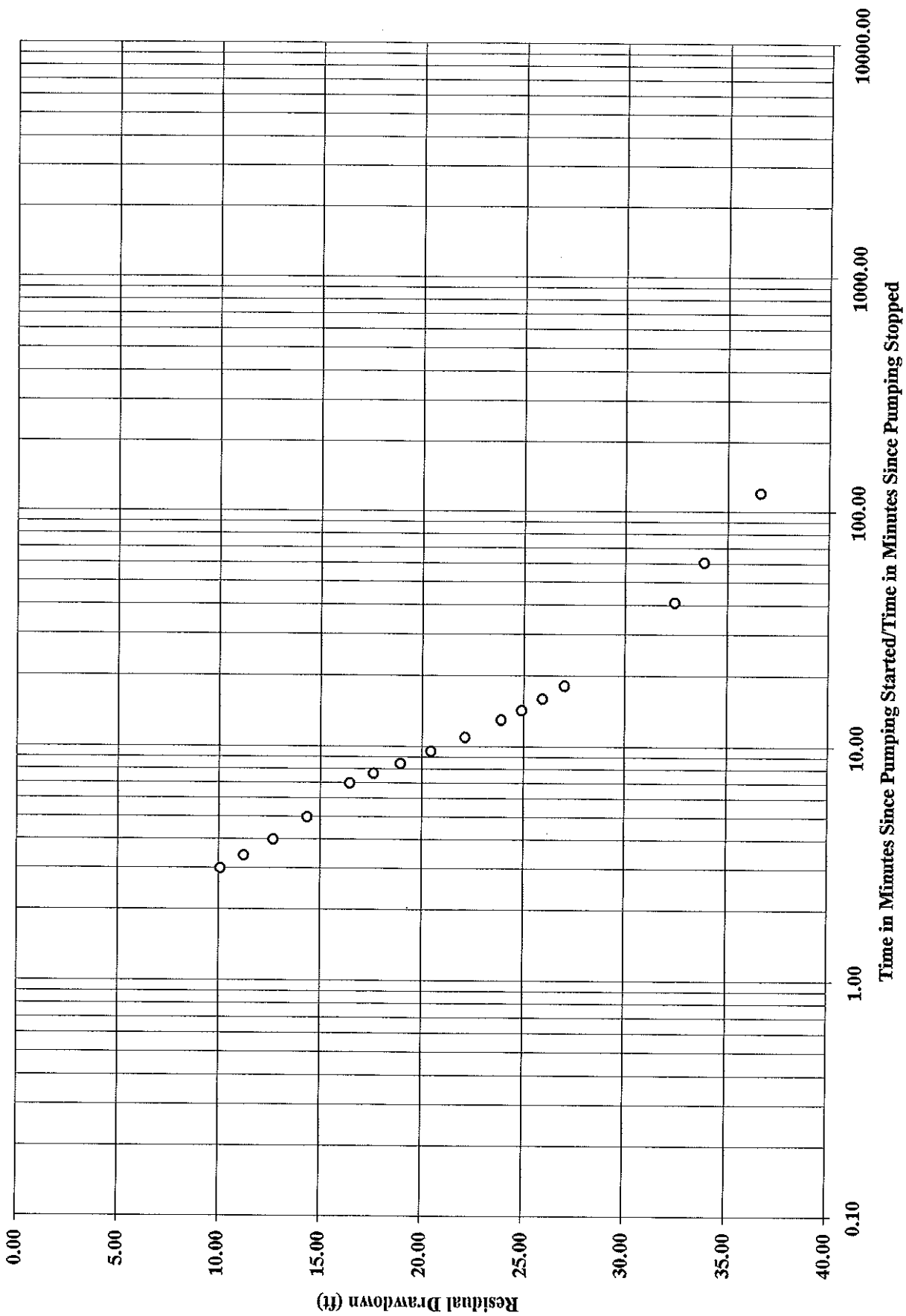
VALLEY WATER SERVICES

RECOVERY DATA

| START DATE: July 14/95 | | FINISH DATE: July 14/95 | | | | | |
|---|---------|-------------------------------------|--------------------------|-----------------|--------|----------------------|----------|
| PROJECT: Norgard Developments | | WELL #: TW-1B | | | | | |
| LOCATION: 25575 100th Ave. Maple Ridge B.C. | | REF#: NORDE1BR | | | | | |
| DATUM POINT: T.O.C. | | ELEVATION OF DATUM POINT: 3' | | | | | |
| S.W.L.: 94.84 | | METERS: | | | | | |
| | | FEET: X | | | | | |
| START TIME: 0:15 | | FINISH TIME: 0:45 | | | | | |
| | | ELAPSED TIME: 60 | | | | | |
| DATE | TIME | E.T. START t (min) | E.T. STOP t' (min) | RATIO (t/t') | D.T.W. | RES. DRAW DOWN | COMMENTS |
| 13-May | 0:15:00 | 60.00 | 0 | | 135.80 | 40.96 | |
| | 0:15:30 | 60.50 | 0.50 | 121.00 | 131.46 | 36.62 | |
| | 0:16:00 | 61.00 | 1 | 61.00 | 128.72 | 33.88 | |
| | 0:16:30 | 61.50 | 1.50 | 41.00 | 127.28 | 32.44 | |
| | 0:18:30 | 63.50 | 3.50 | 18.14 | 121.89 | 27.05 | |
| | 0:19:00 | 64.00 | 4 | 16.00 | 120.79 | 25.95 | |
| | 0:19:30 | 64.50 | 4.50 | 14.33 | 119.76 | 24.92 | |
| | 0:20:00 | 65.00 | 5 | 13.00 | 118.74 | 23.90 | |
| | 0:21 | 66 | 6 | 11.00 | 116.95 | 22.11 | |
| | 0:22 | 67 | 7 | 9.57 | 115.28 | 20.44 | |
| | 0:23 | 68 | 8 | 8.50 | 113.80 | 18.96 | |
| | 0:24 | 69 | 9 | 7.67 | 112.47 | 17.63 | |
| | 0:25 | 70 | 10 | 7.00 | 111.30 | 16.46 | |
| | 0:30 | 75 | 15 | 5.00 | 109.23 | 14.39 | |
| | 0:35 | 80 | 20 | 4.00 | 107.55 | 12.71 | |
| | 0:40 | 85 | 25 | 3.40 | 106.10 | 11.26 | |
| | 0:45 | 90 | 30 | 3.00 | 104.94 | 10.10 | |

VALLEY WATER SERVICES

Time-Recovery Plot For Pumping Test of
NORGARD DEVELOPMENTS TW-1B
JULY 14/95



VALLEY WATER SERVICES

| DRAWDOWN | | | | | | | |
|---|----------|--------------------------------|----------|-------------------------------------|-----|---------------|----------|
| START DATE: July 13/95 | | FINISH DATE: July 14/95 | | | | | |
| PROJECT: Norgard Development | | | | WELL#: T-W-1B | | | |
| LOCATION: 25575 100th Ave Maple Ridge, B.C. | | | | REF. #: NORDE1BD | | | |
| DATUM POINT: T.O.C. | | | | ELEVATION OF DATUM POINT: 3' | | | |
| S.W.L.: 94.84 | | METERS: | | PUMP USED: 1 HP | | | |
| | | FEET: | | | | | |
| START TIME: 11:15 | | FINISH TIME: 0:15 | | | | | |
| DATE | TIME | E.T. | D. to W. | DRAW DOWN | SEC | RATE USGPM | COMMENTS |
| 13-Jul | 11:15:00 | 0 | 94.84 | 0.00 | | | |
| | 11:17:00 | 2 | 109.30 | 14.46 | | | MILKY |
| | 11:18:00 | 3 | 114.26 | 19.42 | | | |
| | 11:19:00 | 4 | 118.19 | 23.35 | | | |
| | 11:20:00 | 5 | 121.76 | 26.92 | | | NO FINES |
| | 11:22 | 7 | 126.80 | 31.96 | | | CLEARING |
| | 11:23 | 8 | 129.31 | 34.47 | 20 | 15.75 | |
| | 11:27 | 12 | 137.51 | 42.67 | | | CLEAR |
| | 11:31 | 16 | 143.70 | 48.86 | | | |
| | 11:35 | 20 | 148.46 | 53.62 | | | |
| | 11:40 | 25 | 152.60 | 57.76 | 20 | 15.75 | |
| | 11:45 | 30 | 155.64 | 60.80 | | | |
| | 11:50 | 35 | 157.90 | 63.06 | | | |
| | 11:55 | 40 | 160.18 | 65.34 | | | MILKY |
| | 0:00 | 45 | 160.42 | 65.58 | | | |
| | 0:05 | 50 | 161.18 | 66.34 | 20 | 15.75 | CLEAR |
| | 0:15 | 60 | 163.64 | 68.80 | | | |