APPENDIX F

MUNICIPAL WATER LEVEL HYDROGRAPHS

MUNICIPAL WATER LEVEL HYDROGRAPHS

The Safe Additional Available Drawdown value used in the Risk Assessment is the difference between the existing conditions (2008) water level elevation, and the safe water level elevation reported by the Region (which may be coincident with the top of screen, open hole, etc.). A series of observed water level hydrographs were created to examine the water level variability in the Region's municipal wells from 2000 to 2011 and are included in this Appendix.

The left hand side of each hydrograph contains the following well construction information:

- Ground surface elevation (m above sea level [asl])
- Interpreted observed 2008 average groundwater elevation (m asl)
- Pump intake elevation
- Elevation at the Top and Bottom of the Screen/Open Hole
- Safe Additional Available Drawdown (m)

This information is illustrated schematically on the well diagram located to the left of the hydrograph.

The hydrograph located in the central portion of the page contains a legend beneath the graph, and highlights the following information:

- Observed groundwater elevations (m asl)
- Interpreted observed 2008 Average groundwater elevation (m asl)
- Average monthly pumping rate (m^3/d)
- 2008 average annual pumping rate (m^3/d)
- Allocated Rates (m^3/d)
- Safe water level elevation (m asl)

In some instances, the observed groundwater elevations illustrated on the hydrographs are inaccurate and were not used in the development of the Safe Additional Available Drawdown values. Appendix H lists these wells and the methodology used to develop the alternative observed 2008 pumped water level elevations used in the calculation of the Safe Additional Available Drawdown values.

HYDROGRAPH
City: Cambridge / Well Field: BLAIR ROAD
Consult_ID: G4 / Obj_Num: 6500110

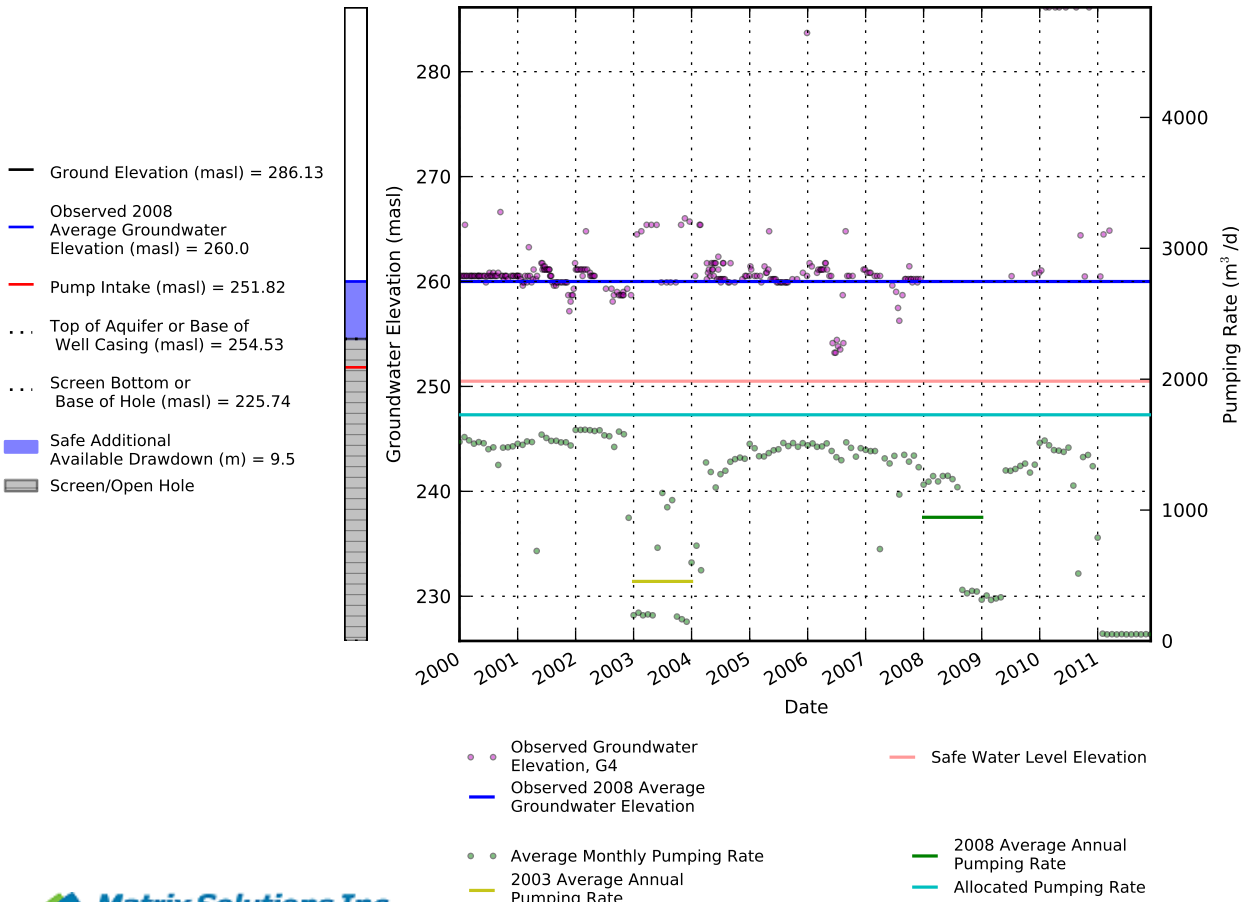

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Figure F1

HYDROGRAPH
City: Cambridge / Well Field: CLEMENS MILL
Consult_ID: G16 / Obj_Num: 1000277

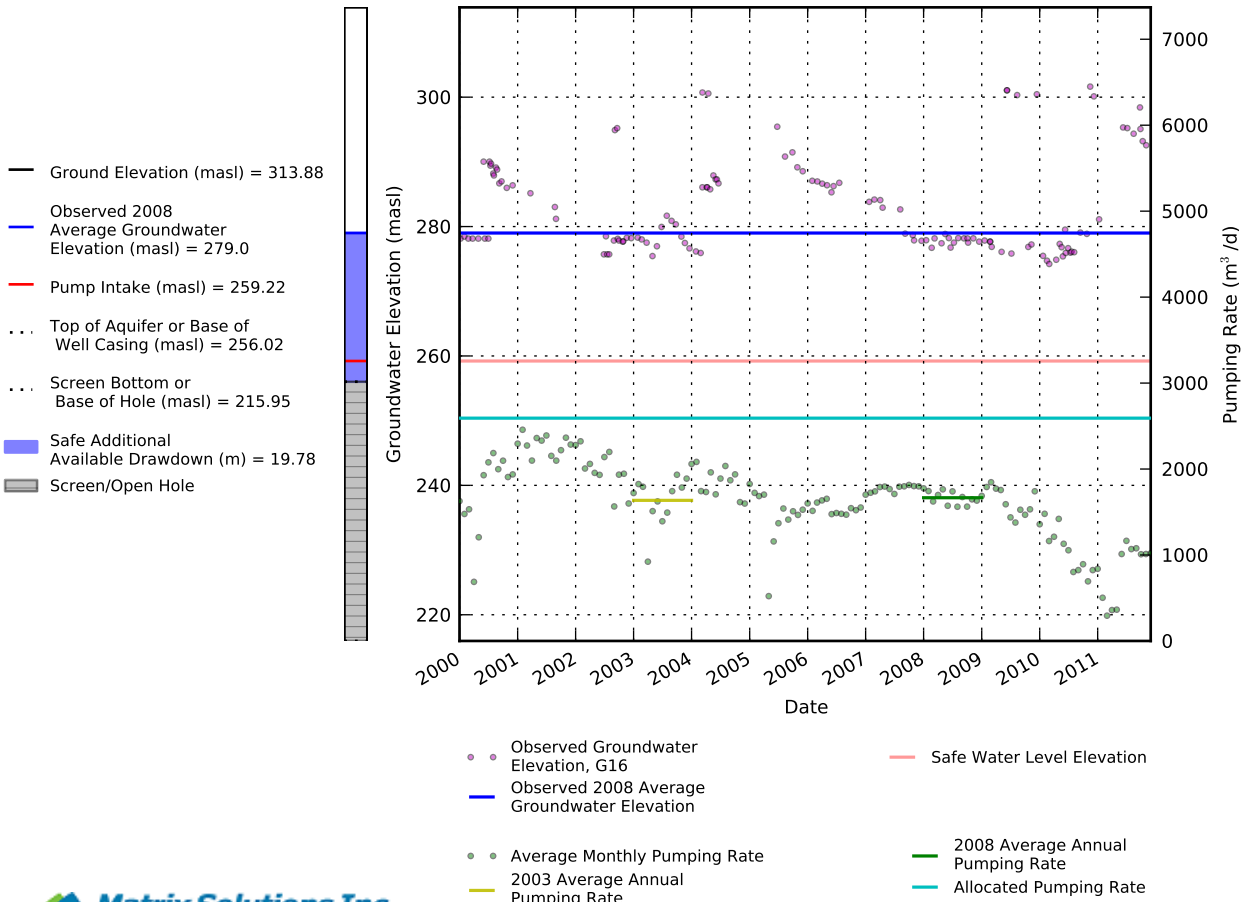

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Figure F2

HYDROGRAPH
City: Cambridge / Well Field: CLEMENS MILL
Consult_ID: G17 / Obj_Num: 1000017

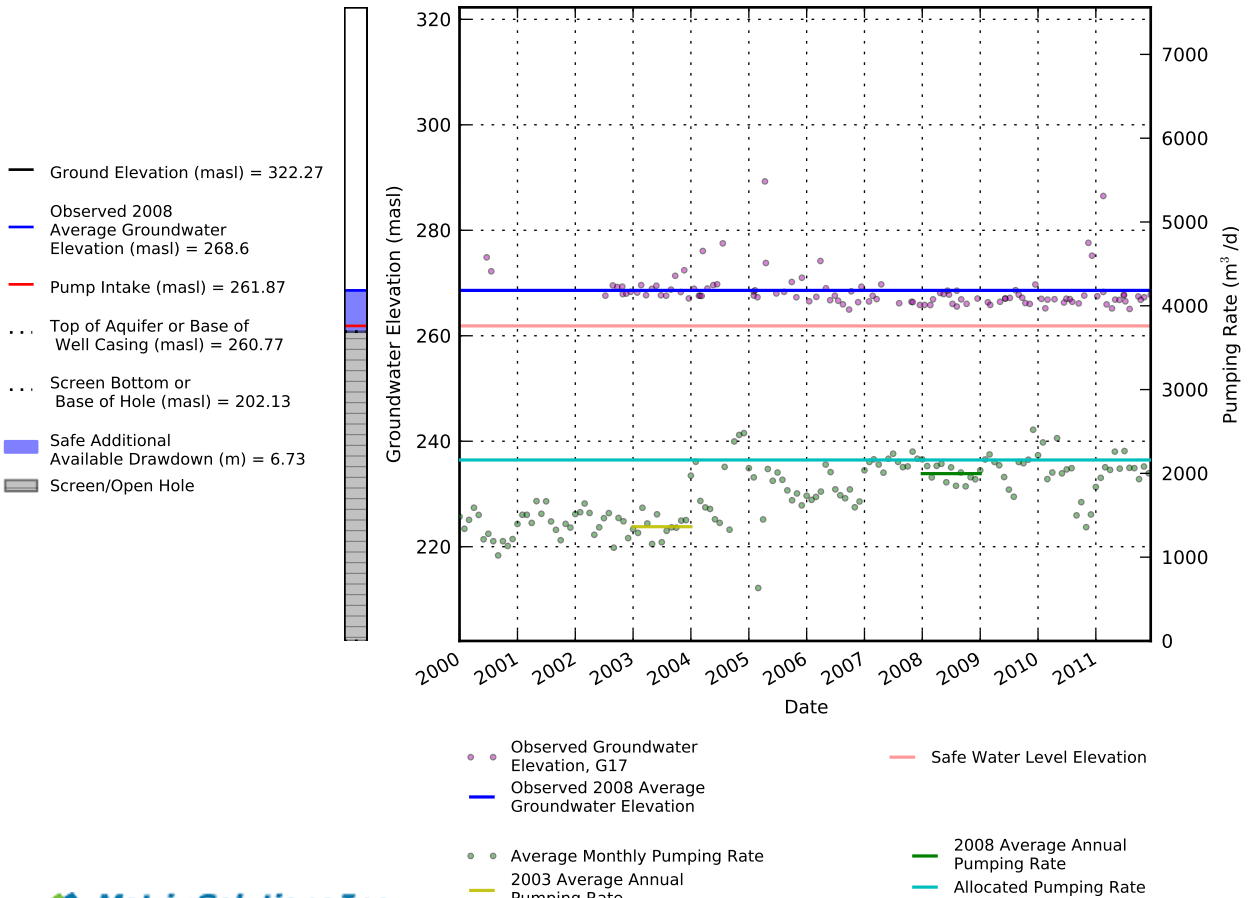

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Figure F3

HYDROGRAPH
City: Cambridge / Well Field: CLEMENS MILL
Consult_ID: G18 / Obj_Num: 1000013

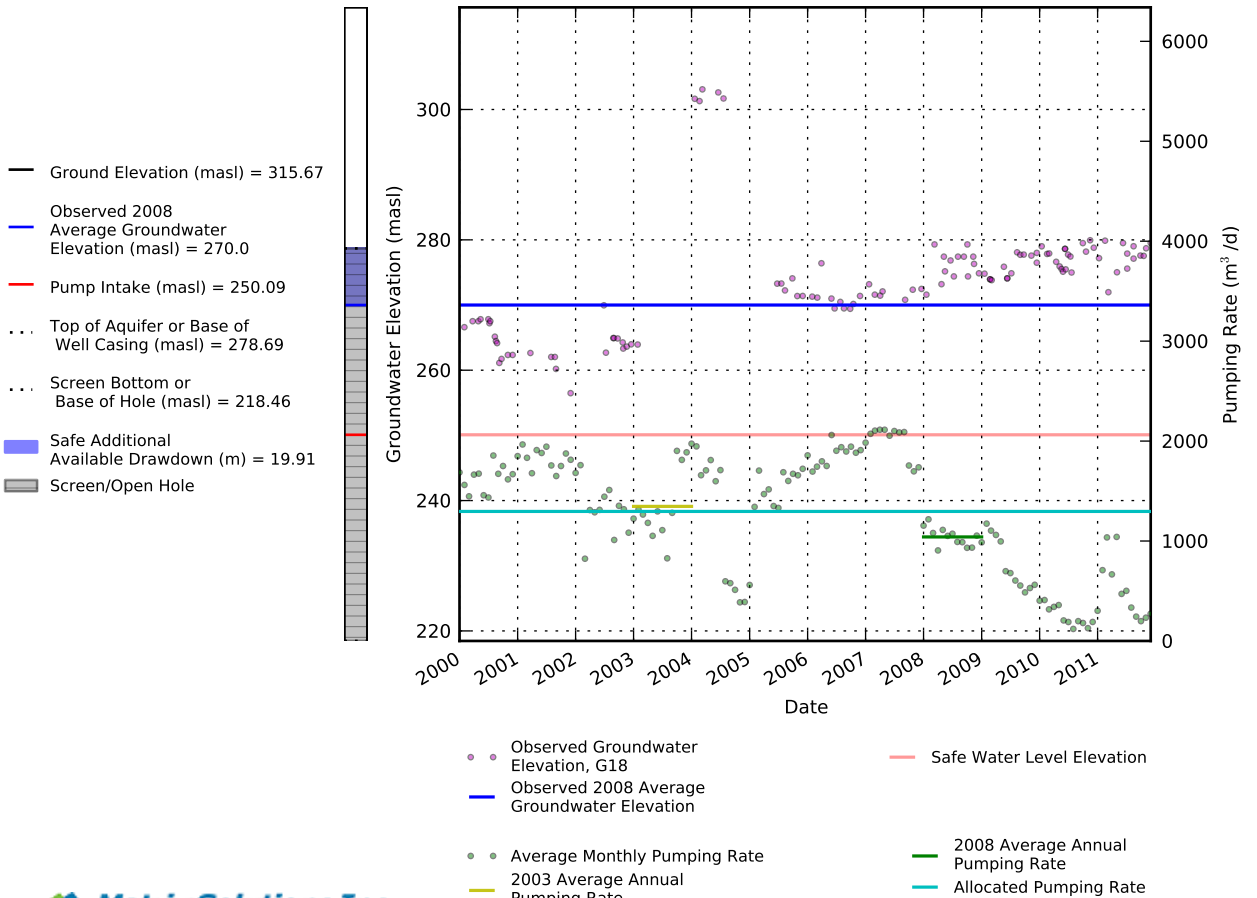

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Figure F4

HYDROGRAPH
City: Cambridge / Well Field: CLEMENS MILL
Consult_ID: G6 / Obj_Num: 6500131

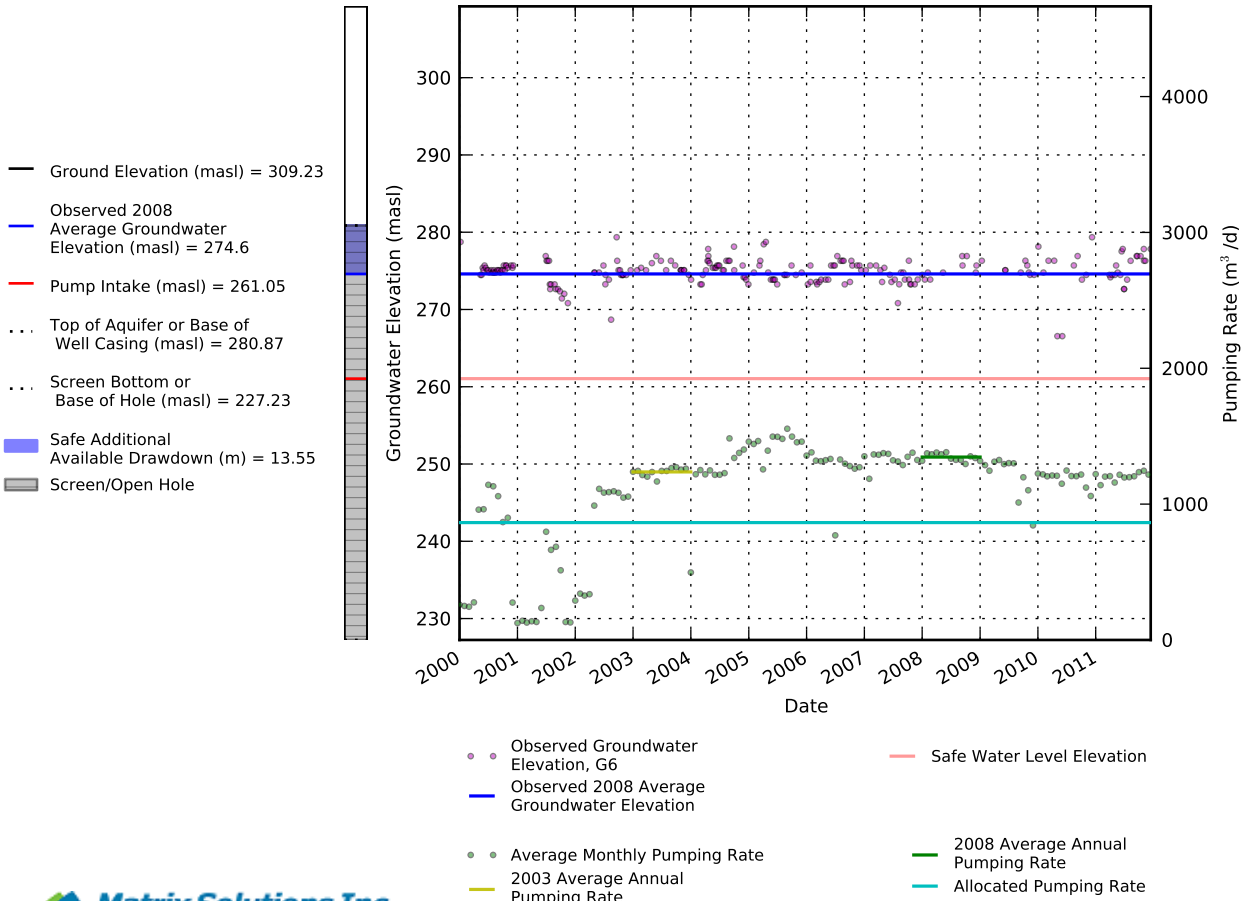

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Figure F5

HYDROGRAPH
City: Cambridge / Well Field: DUNBAR ROAD
Consult_ID: P6 / Obj_Num: 6501155

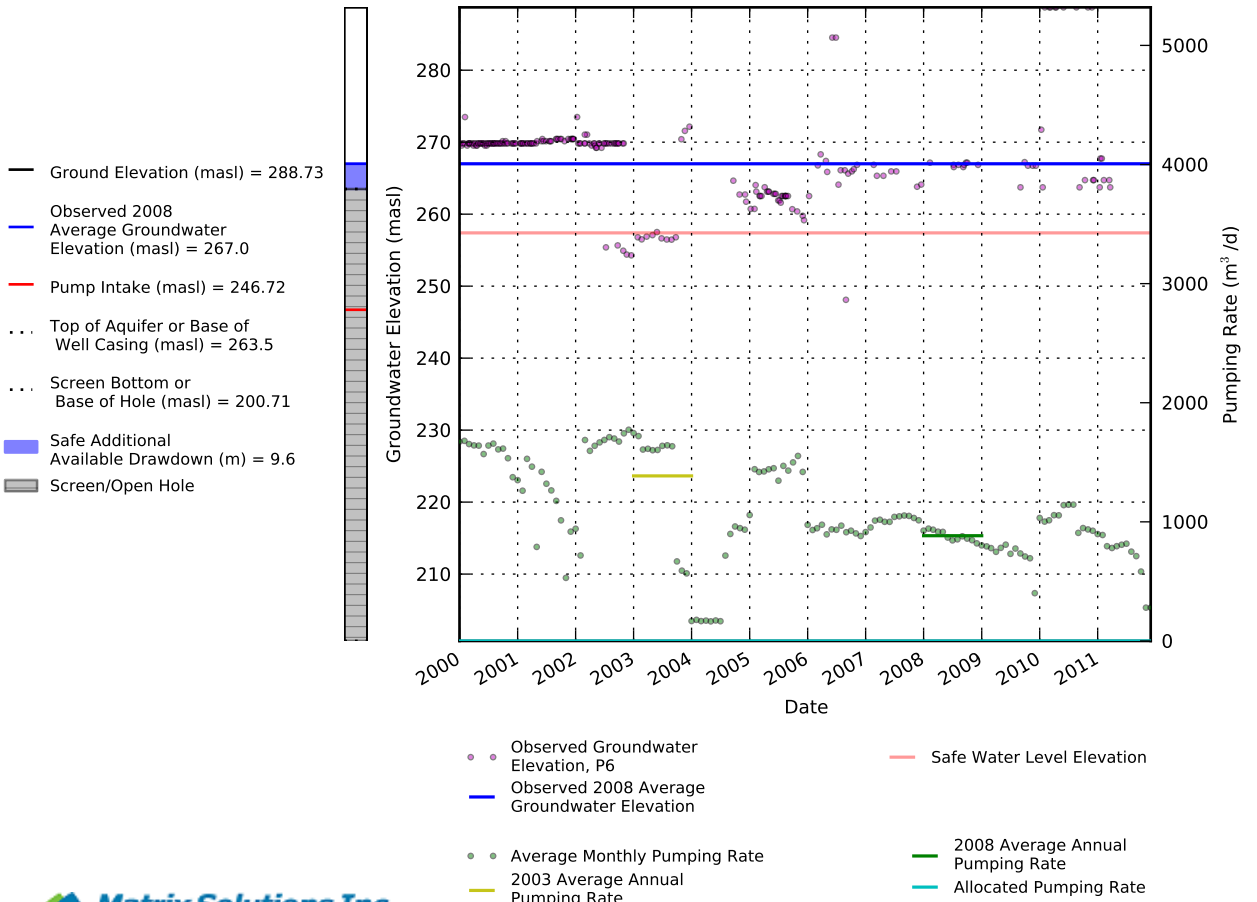

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Figure F6

HYDROGRAPH
City: Cambridge / Well Field: ELGIN STREET
Consult_ID: G9 / Obj_Num: 6500109

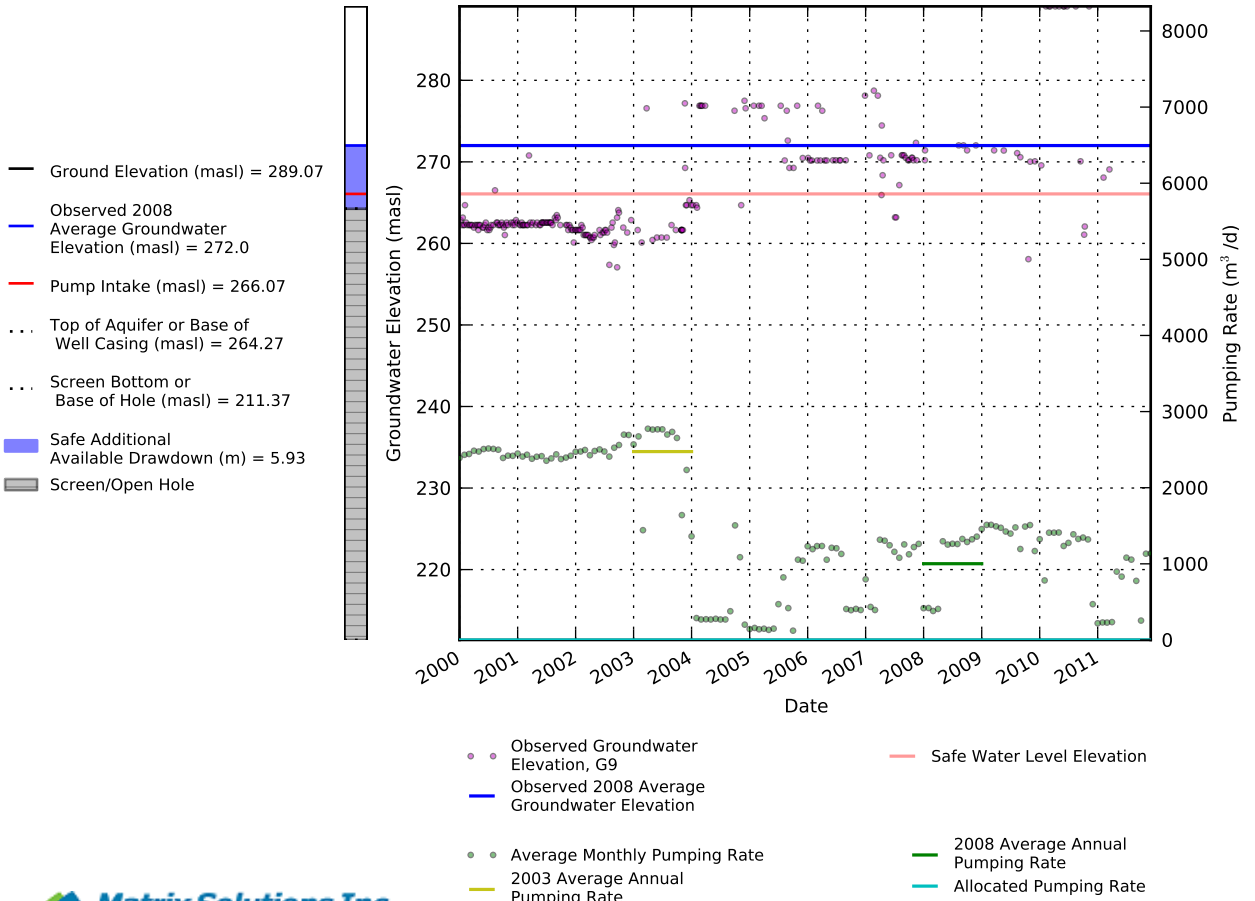

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Figure F7

HYDROGRAPH
City: Cambridge / Well Field: FOUNTAIN STREET
Consult_ID: P16 / Obj_Num: 6505937

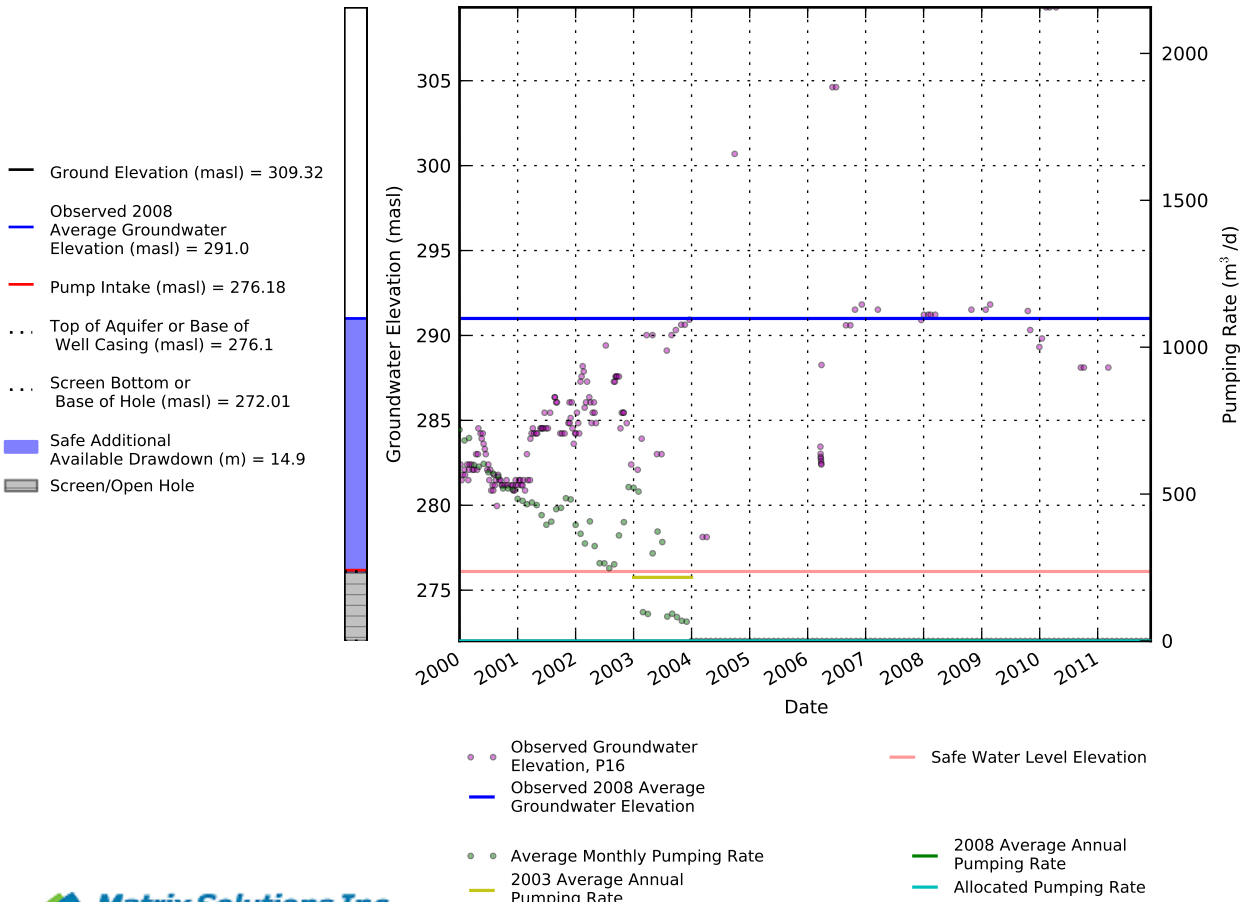

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Figure F8

HYDROGRAPH
City: Cambridge / Well Field: HESPELER
Consult_ID: H3 / Obj_Num: 6500142

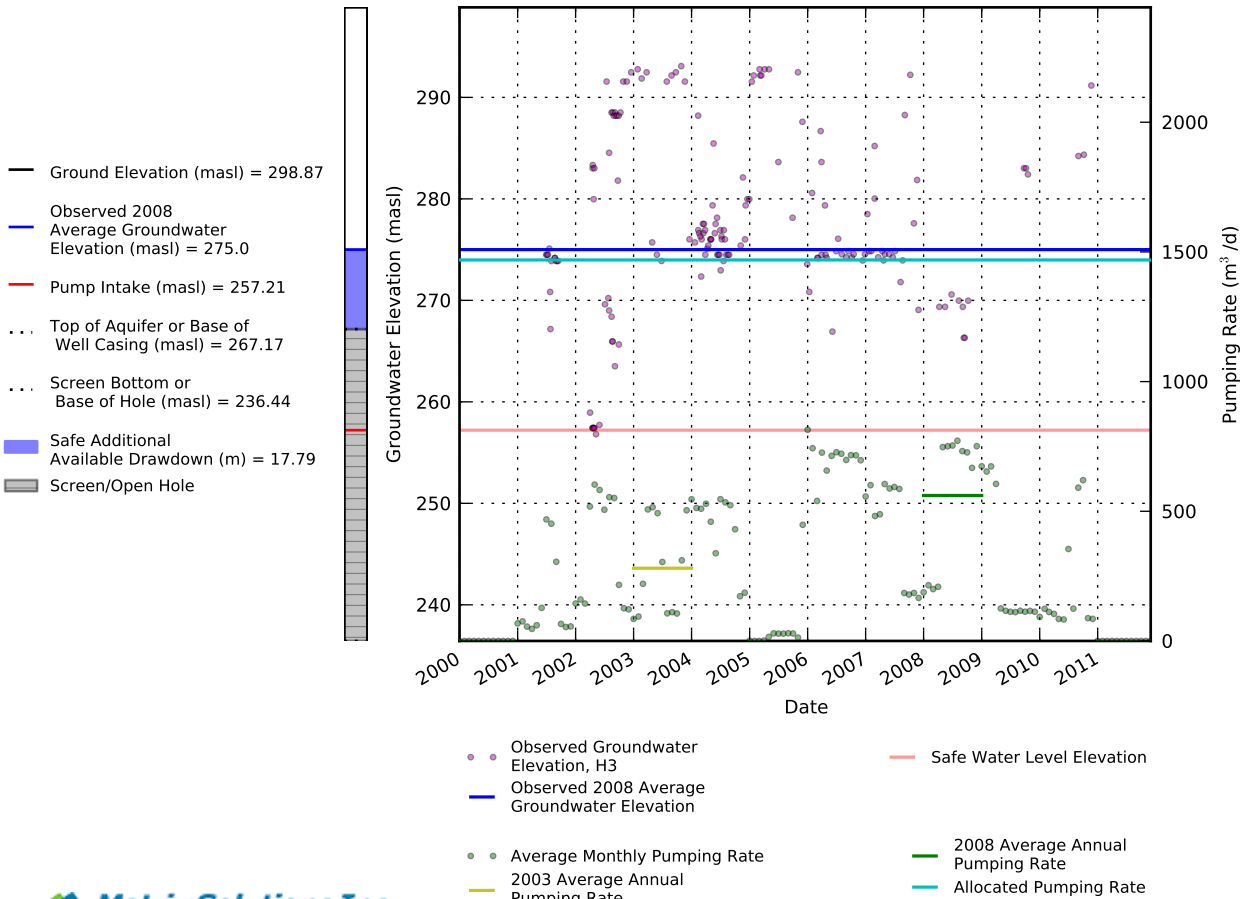

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Figure F9

HYDROGRAPH
City: Cambridge / Well Field: HESPELER
Consult_ID: H4 / Obj_Num: 6500146

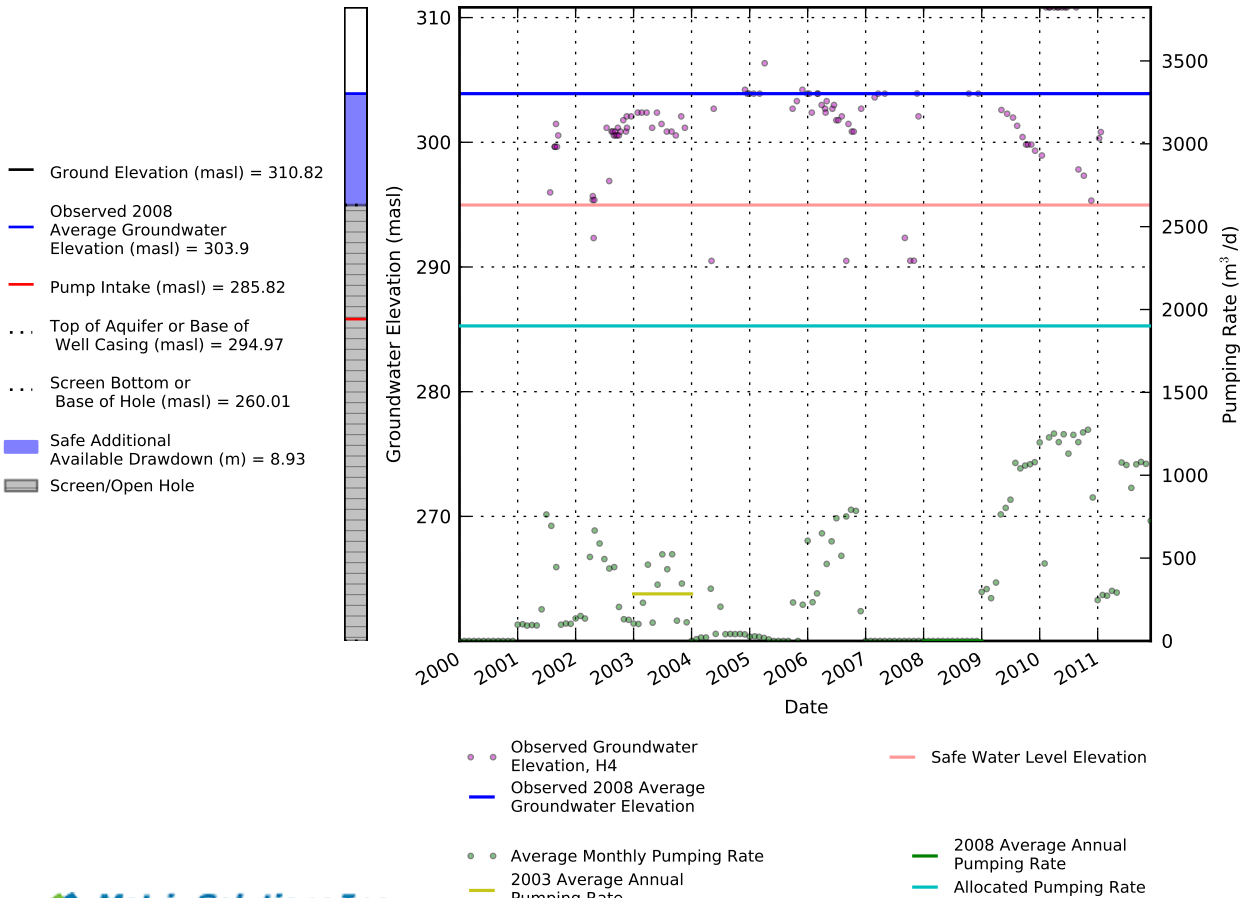

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Figure F10

HYDROGRAPH
City: Cambridge / Well Field: HESPELER
Consult_ID: H5 / Obj_Num: 6500148

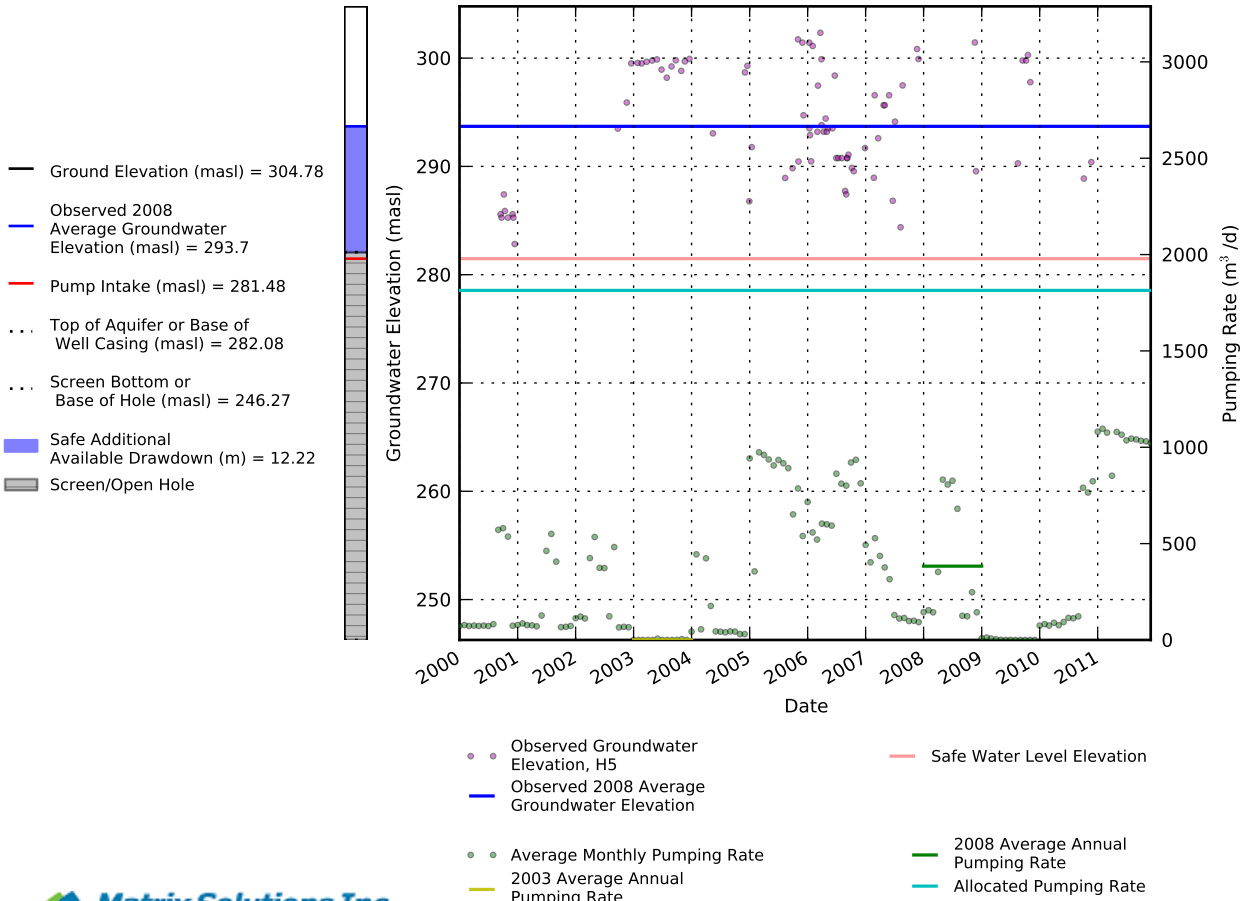

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Figure F11

HYDROGRAPH
City: Cambridge / Well Field: MIDDLETON
Consult_ID: G1 / Obj_Num: 9200002

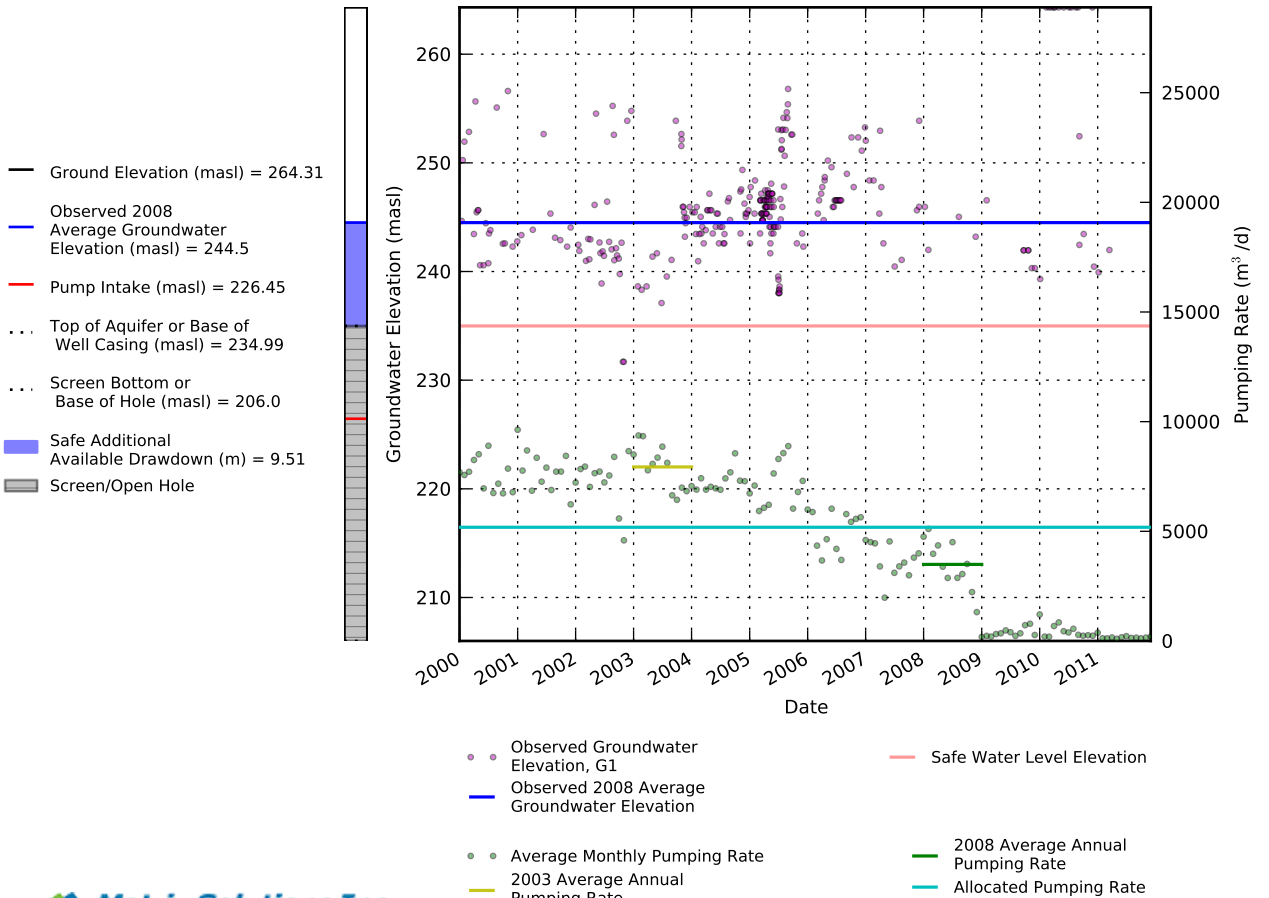

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Figure F12

HYDROGRAPH
City: Cambridge / Well Field: MIDDLETON
Consult_ID: G1A / Obj_Num: 1000315

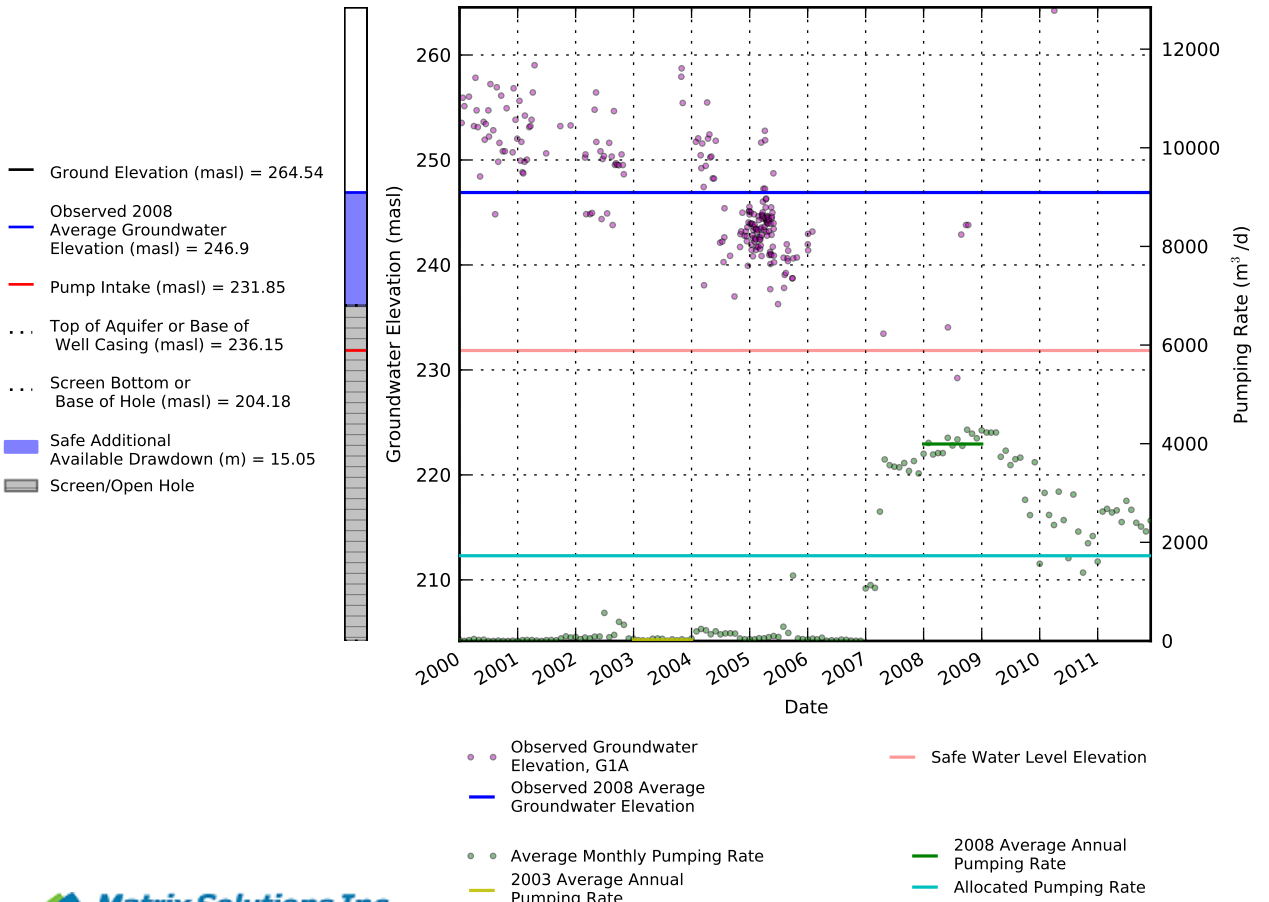

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Figure F13

HYDROGRAPH
City: Cambridge / Well Field: MIDDLETON
Consult_ID: G2 / Obj_Num: 9200003

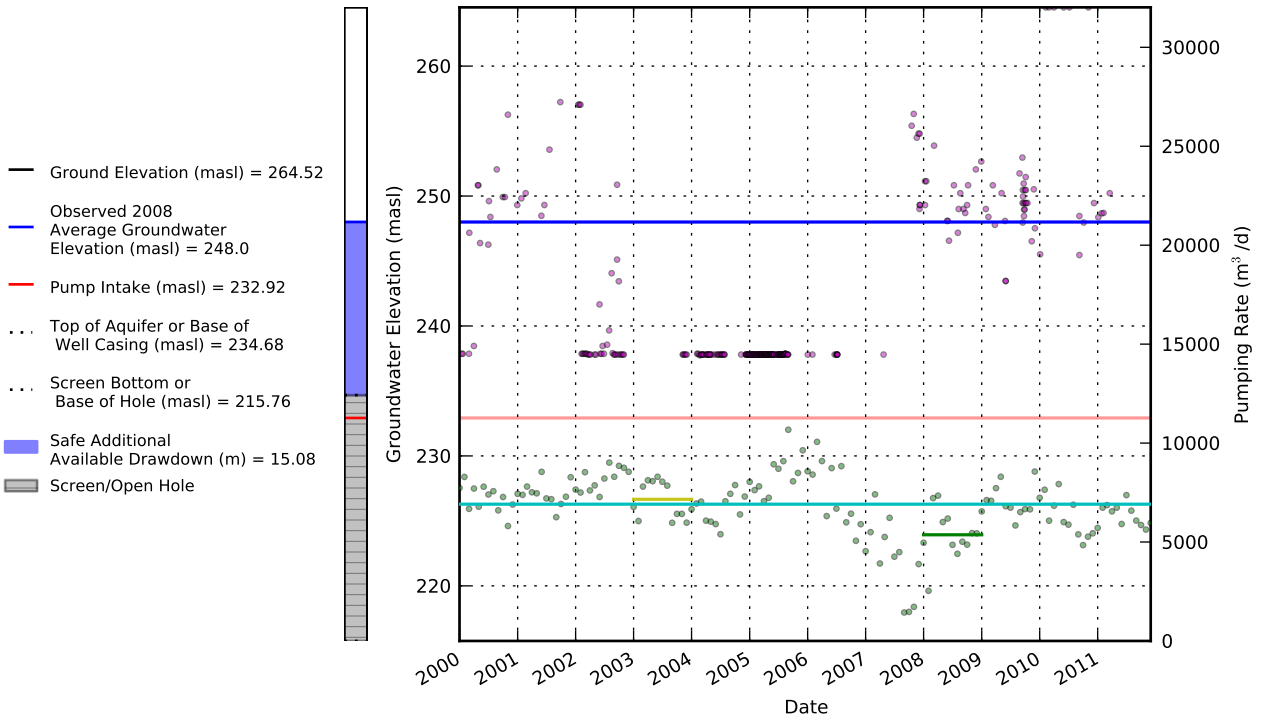

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Figure F14

HYDROGRAPH
City: Cambridge / Well Field: MIDDLETON
Consult_ID: G3 / Obj_Num: 9200004

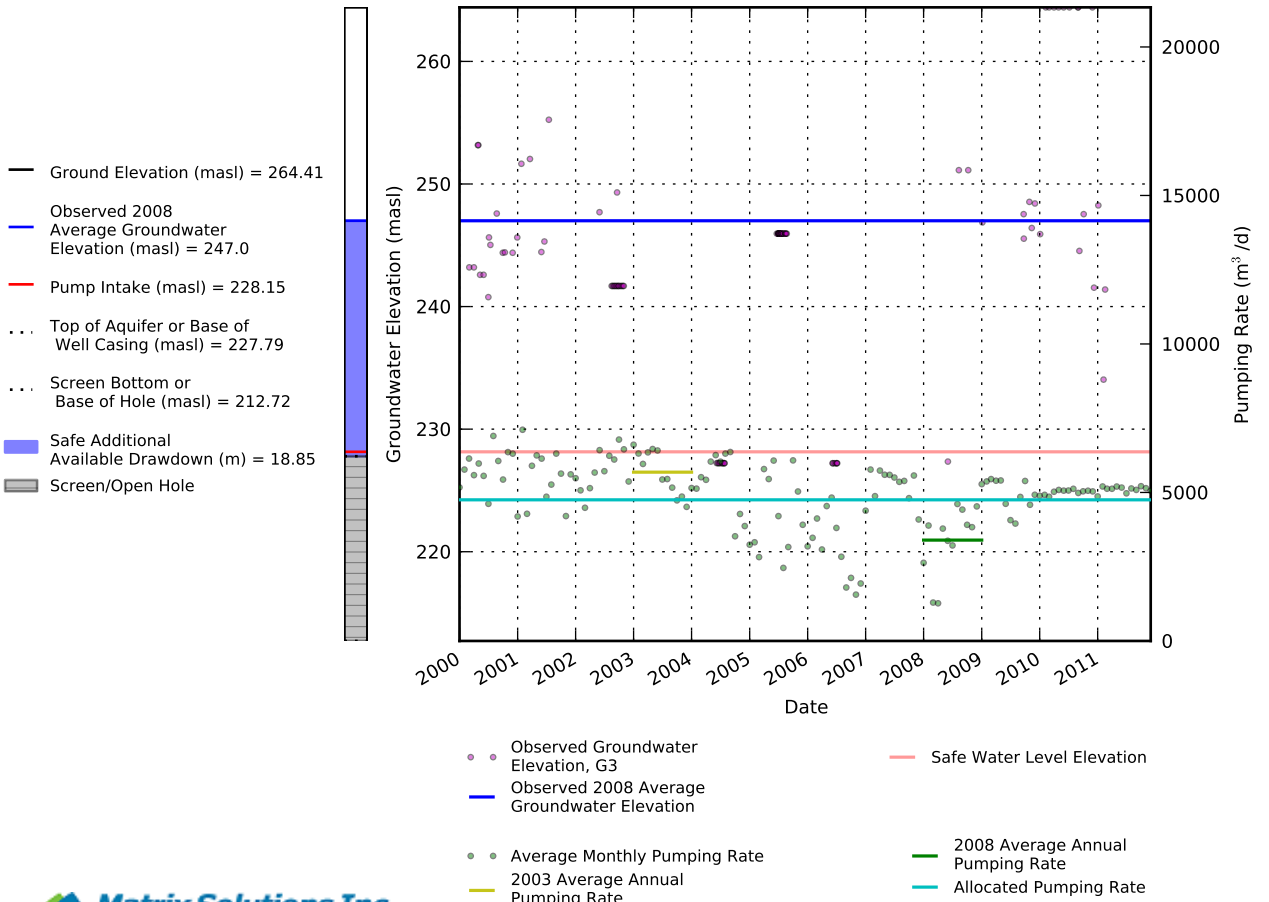

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Figure F15

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: G5 / Obj_Num: 6500129

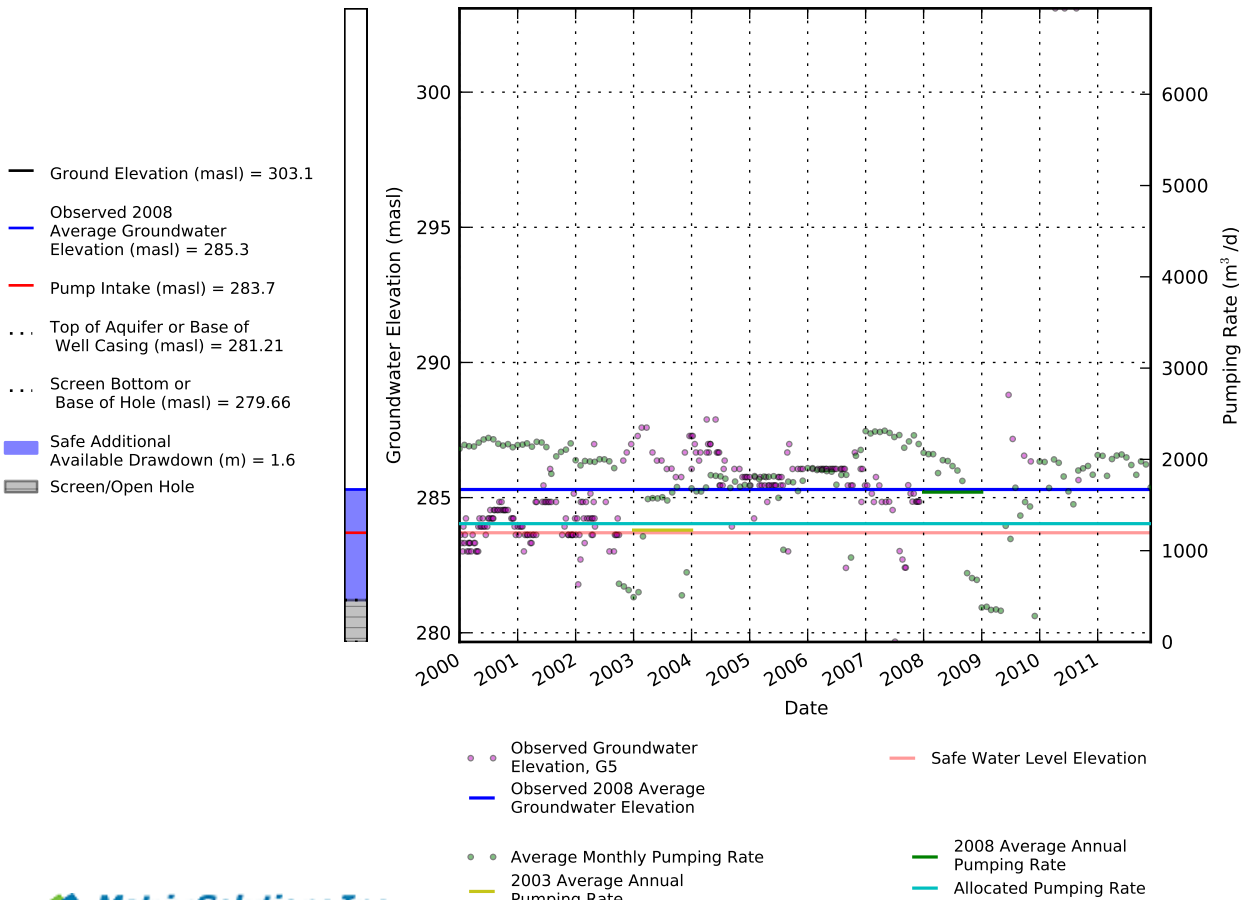

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Figure F16

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: P10 / Obj_Num: 6500132

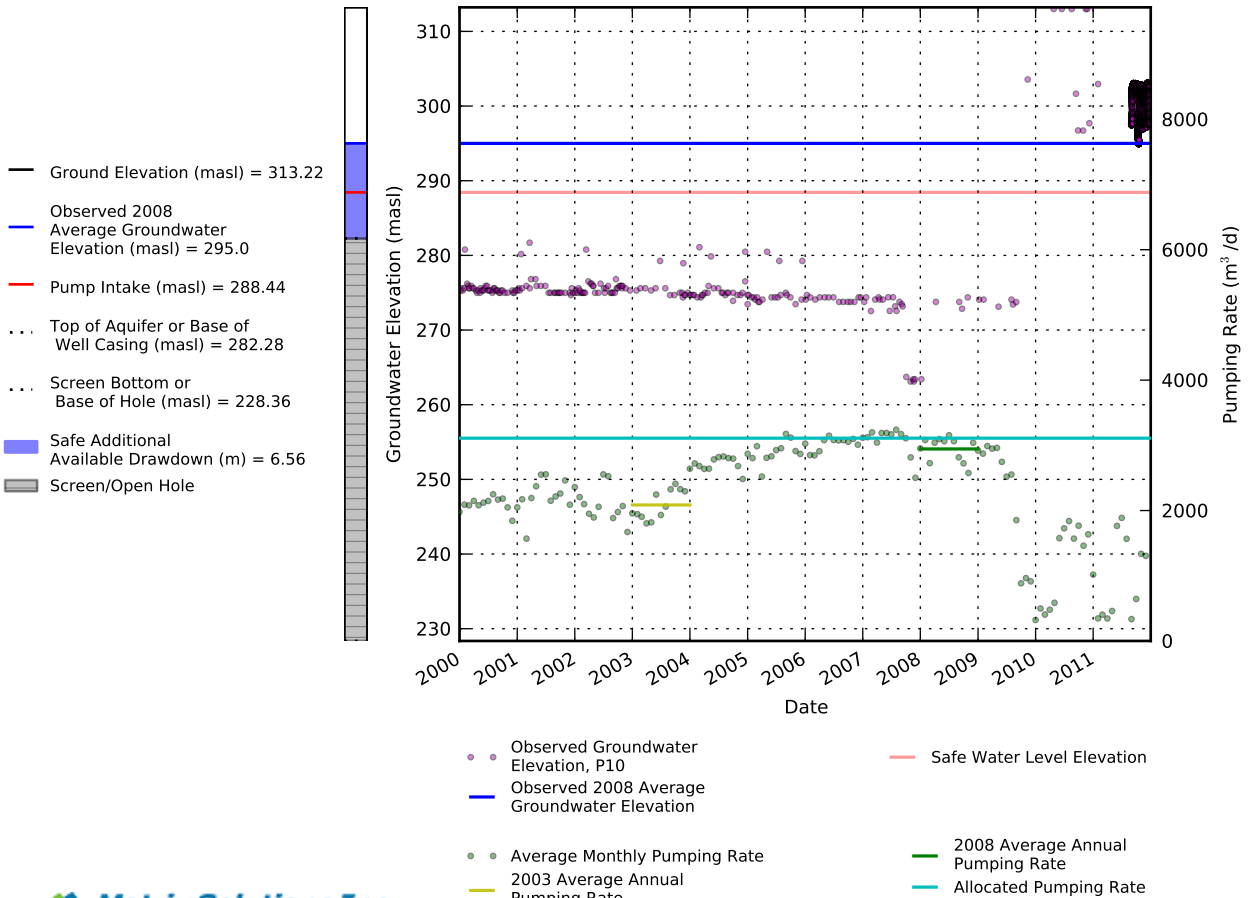

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Figure F17

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: P11 / Obj_Num: 6500130

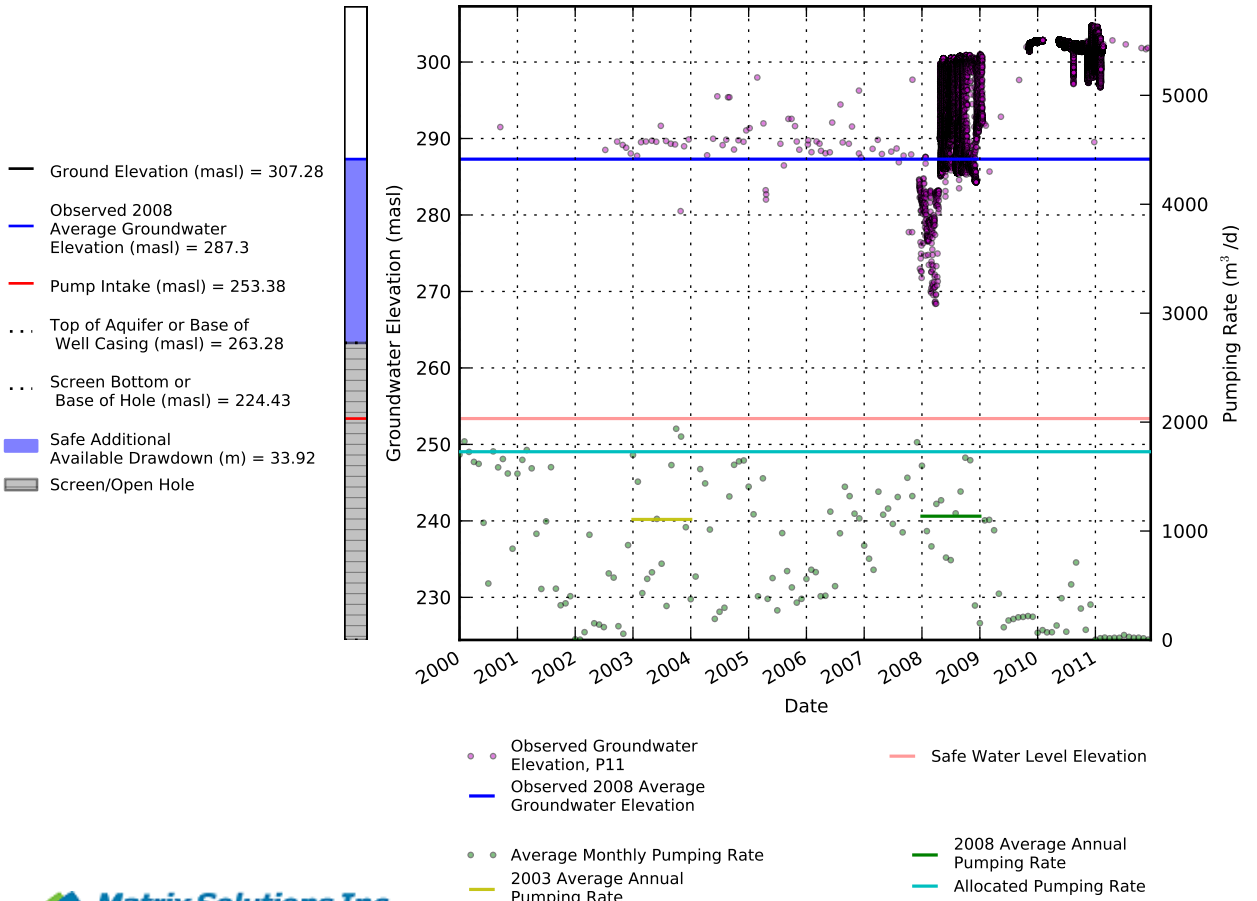

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Figure F18

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: P15 / Obj_Num: 9200010

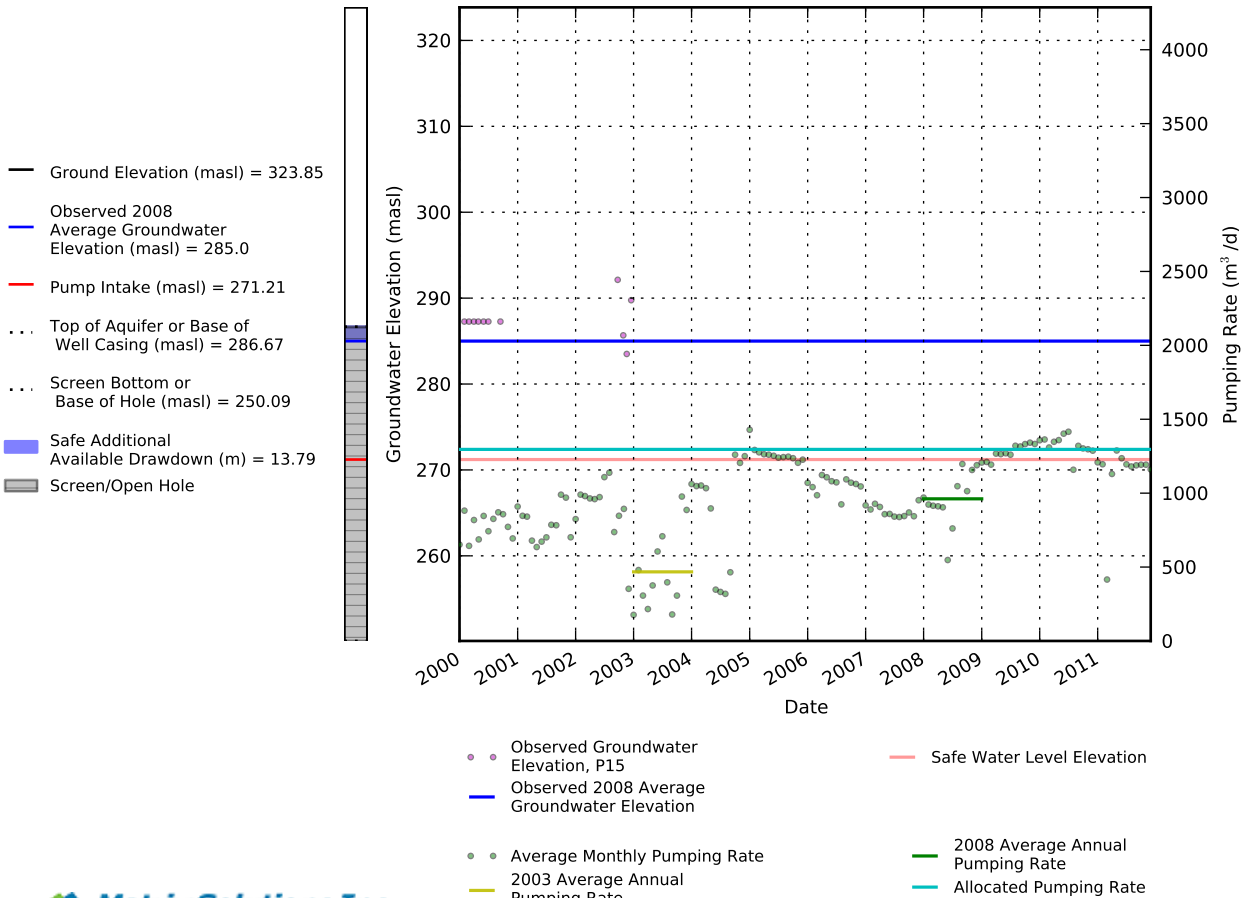

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Figure F19

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: P17 / Obj_Num: 1000021

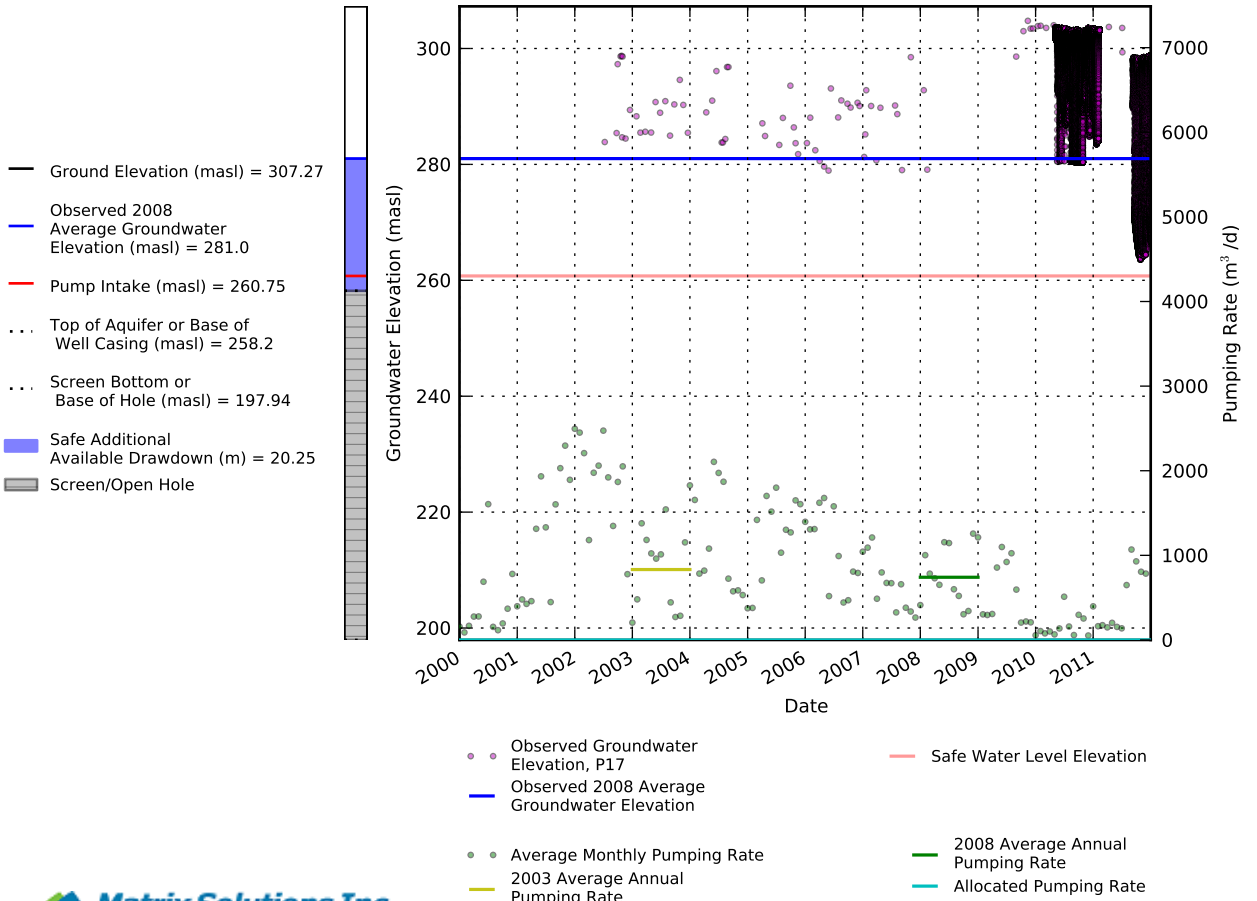

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Figure F20

HYDROGRAPH
City: Cambridge / Well Field: PINEBUSH
Consult_ID: P9 / Obj_Num: 6500128

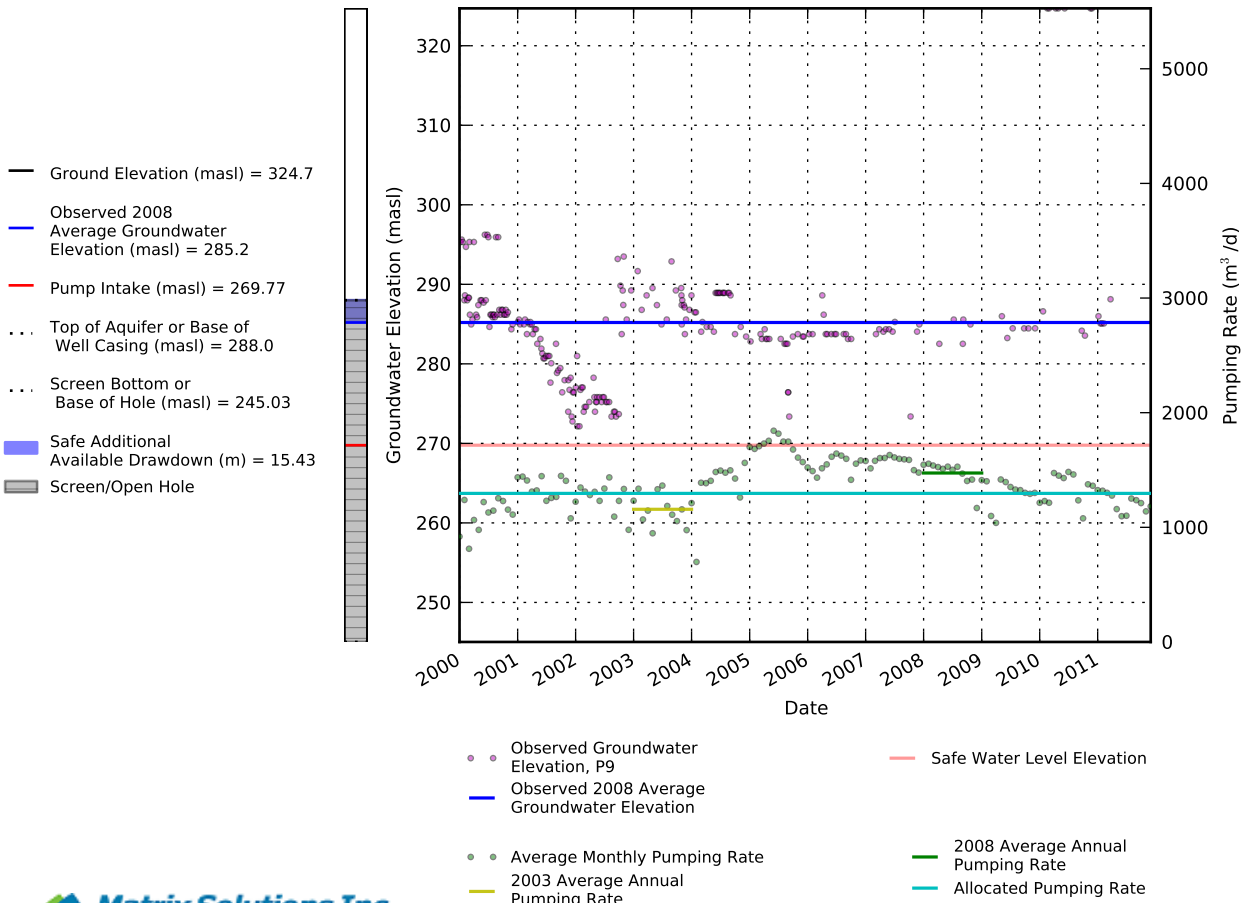

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Figure F21

HYDROGRAPH
City: Cambridge / Well Field: SHADES MILLS
Consult_ID: G38 / Obj_Num: 1000018

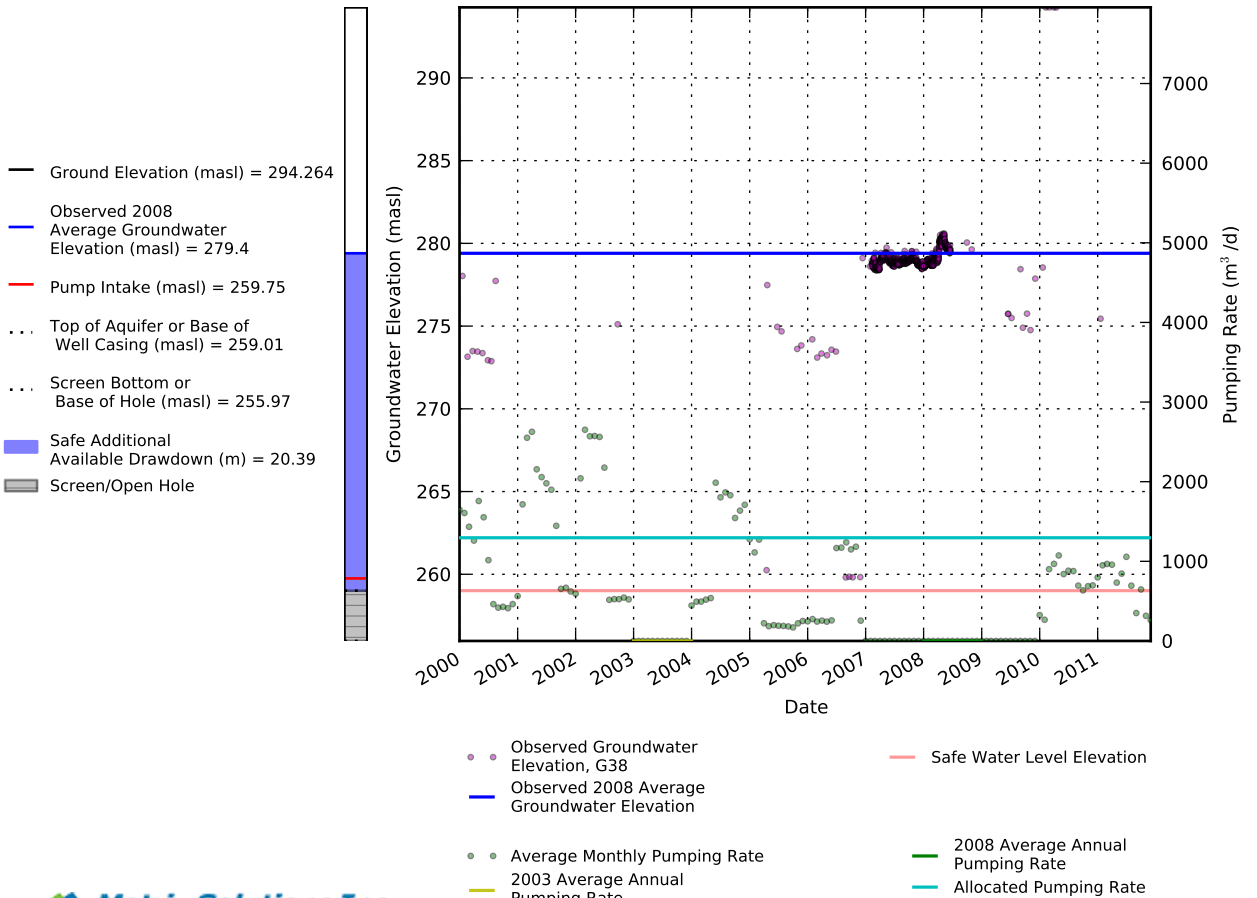

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Figure F22

HYDROGRAPH
City: Cambridge / Well Field: SHADES MILLS
Consult_ID: G39 / Obj_Num: 1000019

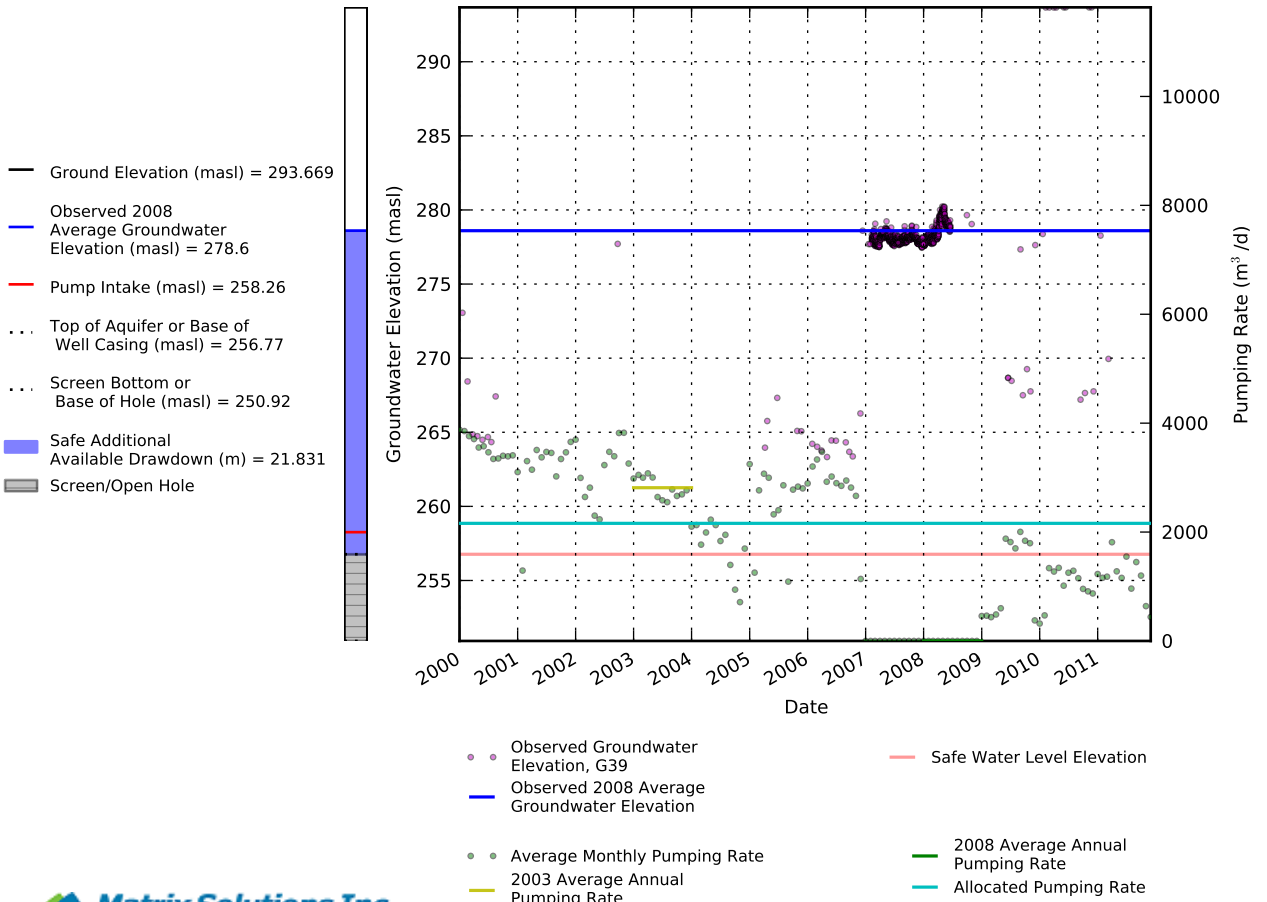

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Figure F23

HYDROGRAPH
City: Cambridge / Well Field: SHADES MILLS
Consult_ID: G7 / Obj_Num: 9200006

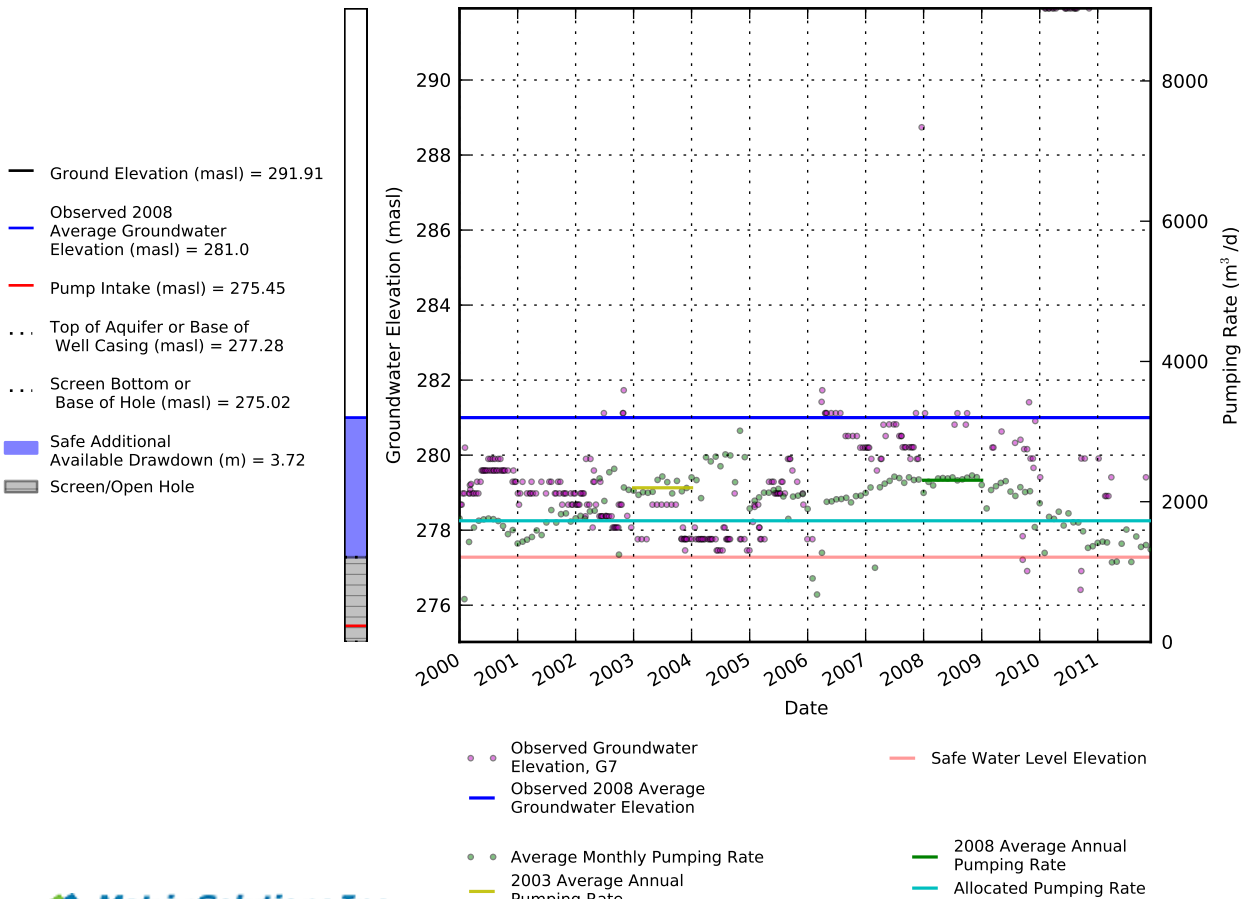

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Figure F24

HYDROGRAPH
City: Cambridge / Well Field: SHADES MILLS
Consult_ID: G8 / Obj_Num: 9200007

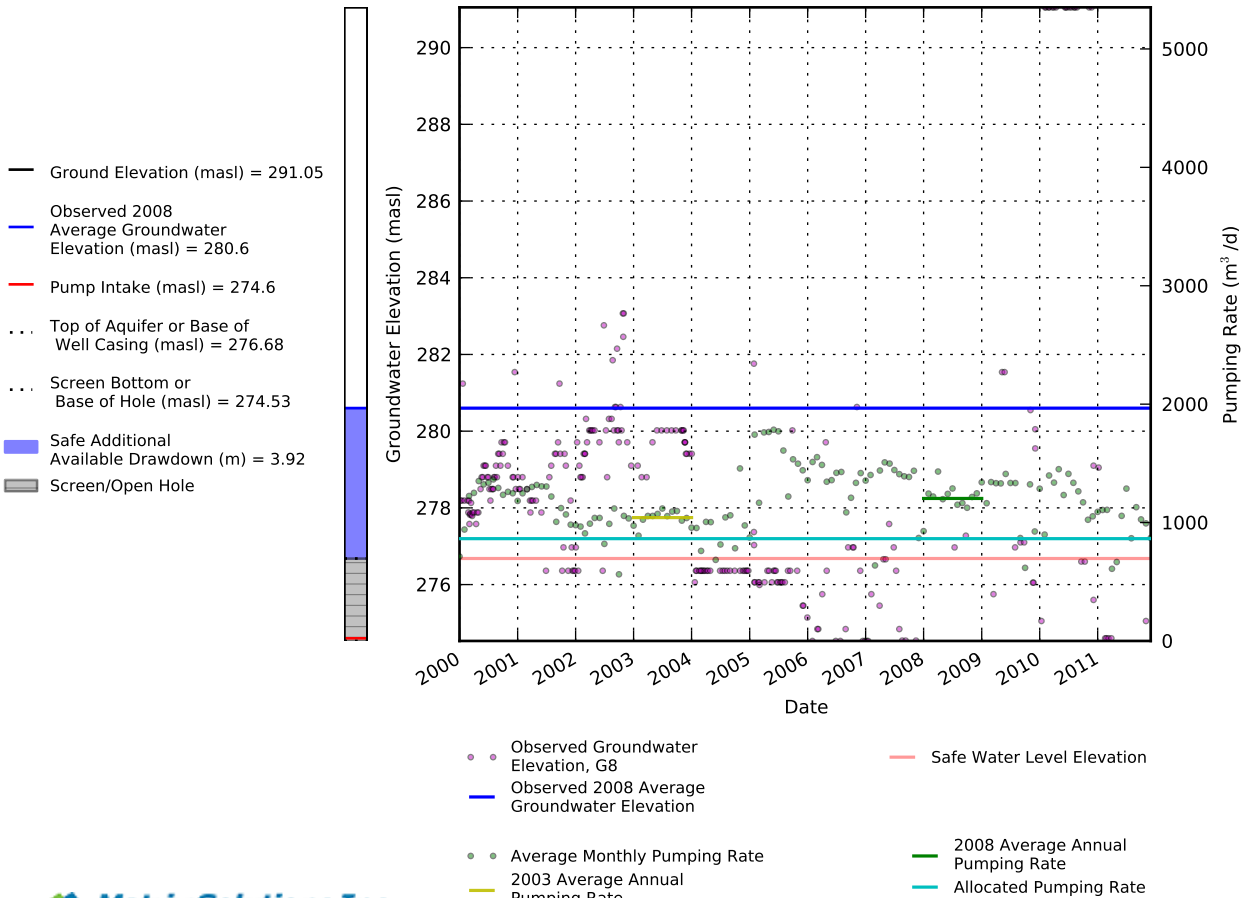

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Figure F25

HYDROGRAPH
City: Cambridge / Well Field: WILLARD
Consult_ID: G15 / Obj_Num: 9200001

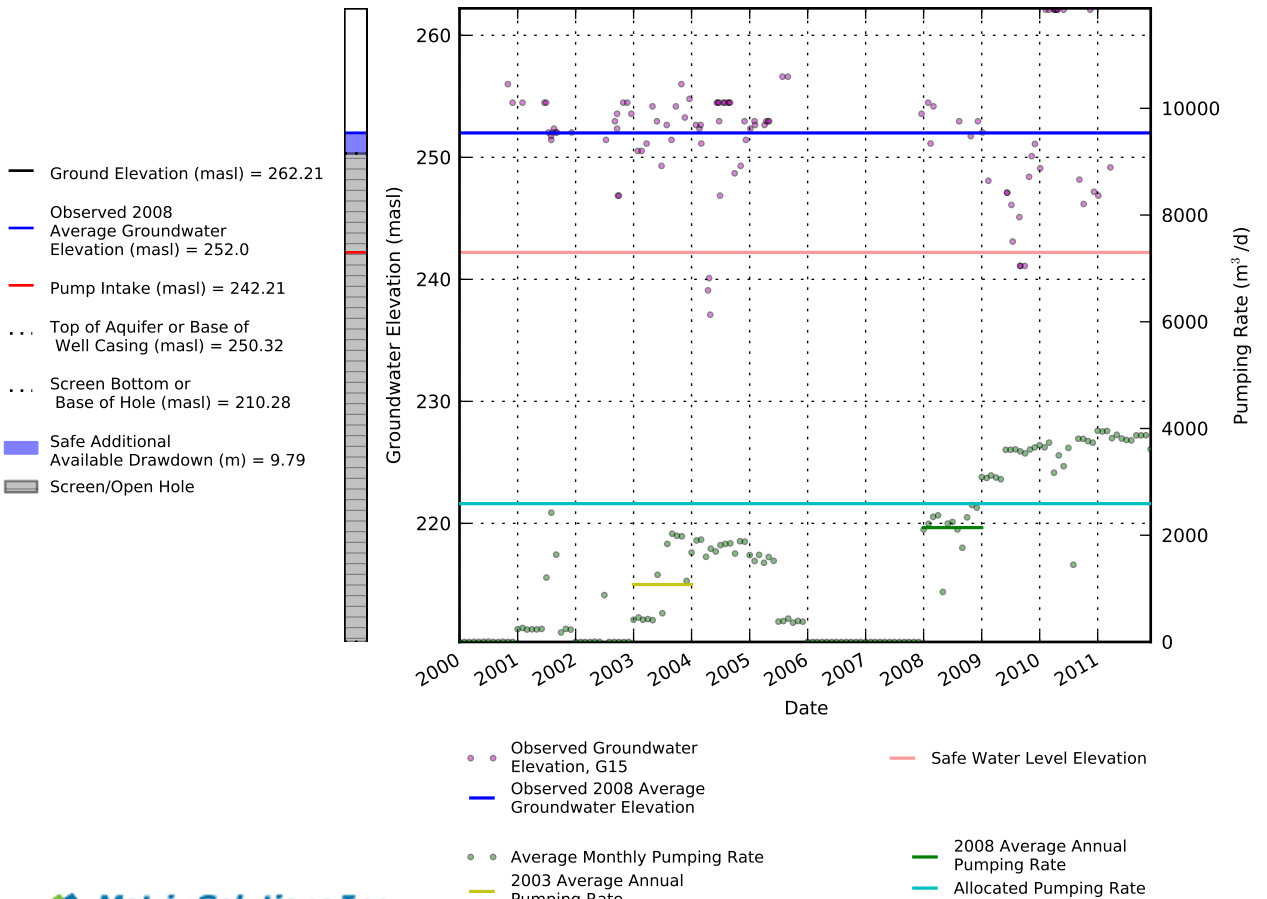

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Figure F26

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K70 / Obj_Num: 6504698

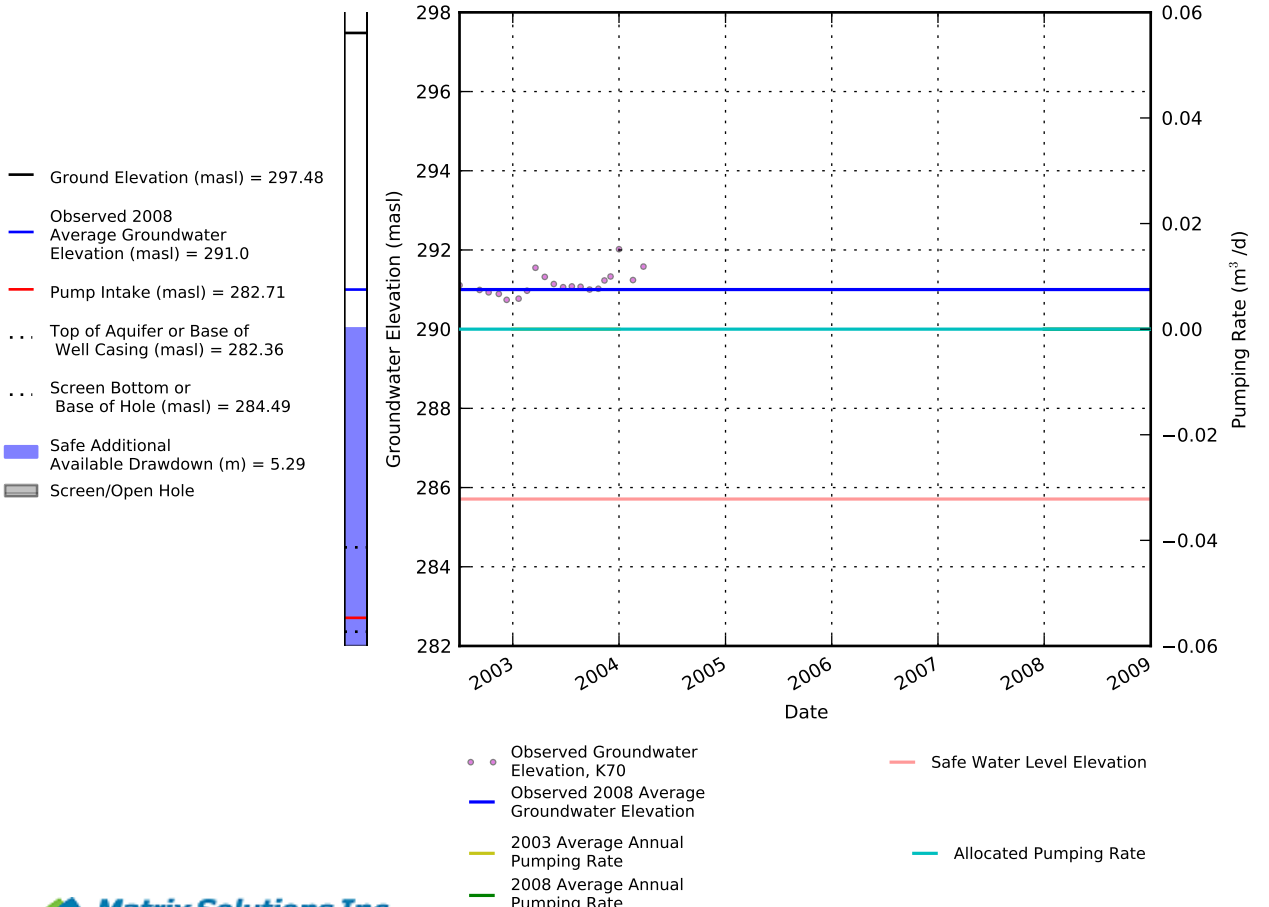

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Figure F27

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K71 / Obj_Num: 6504699

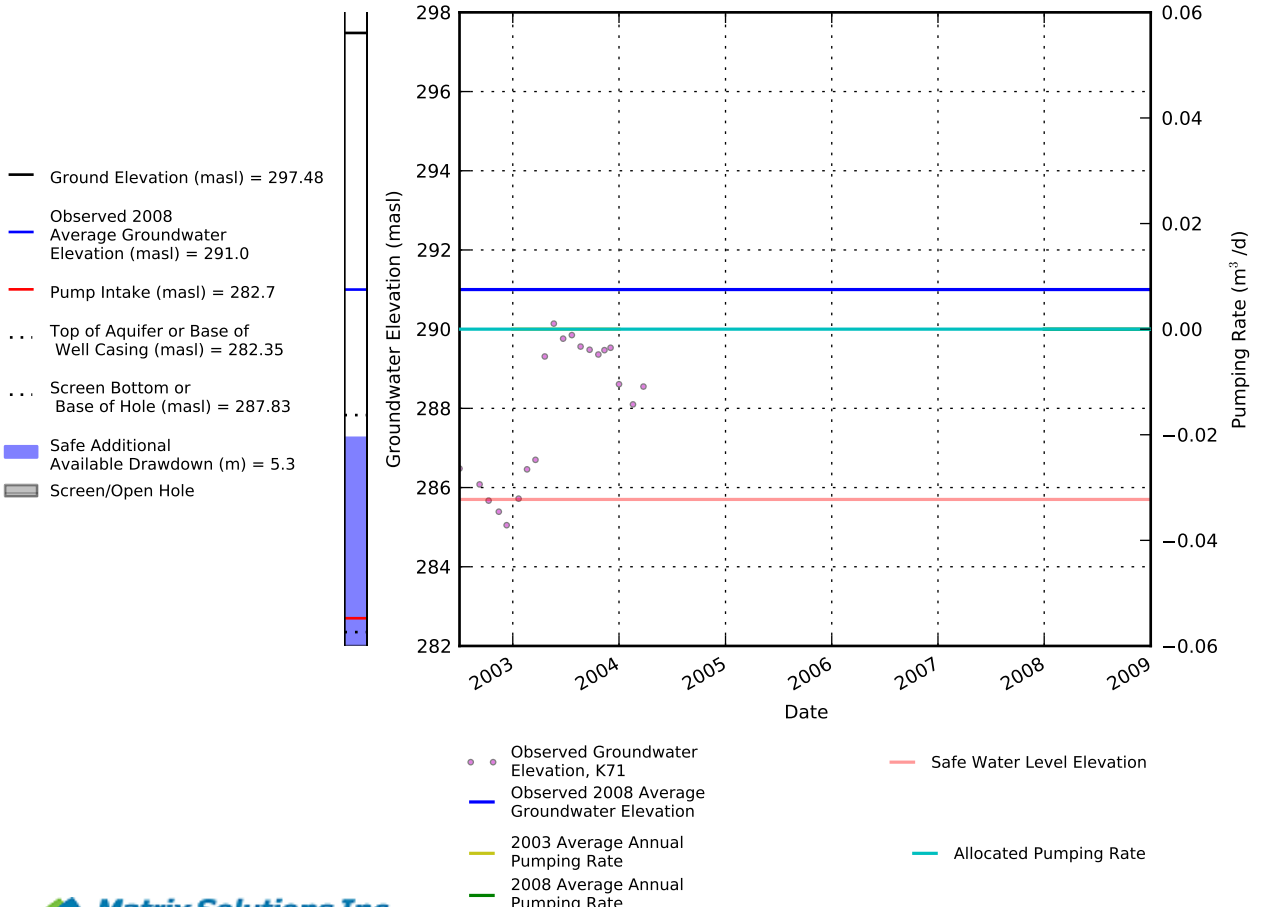

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Figure F28

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K72 / Obj_Num: 6505032

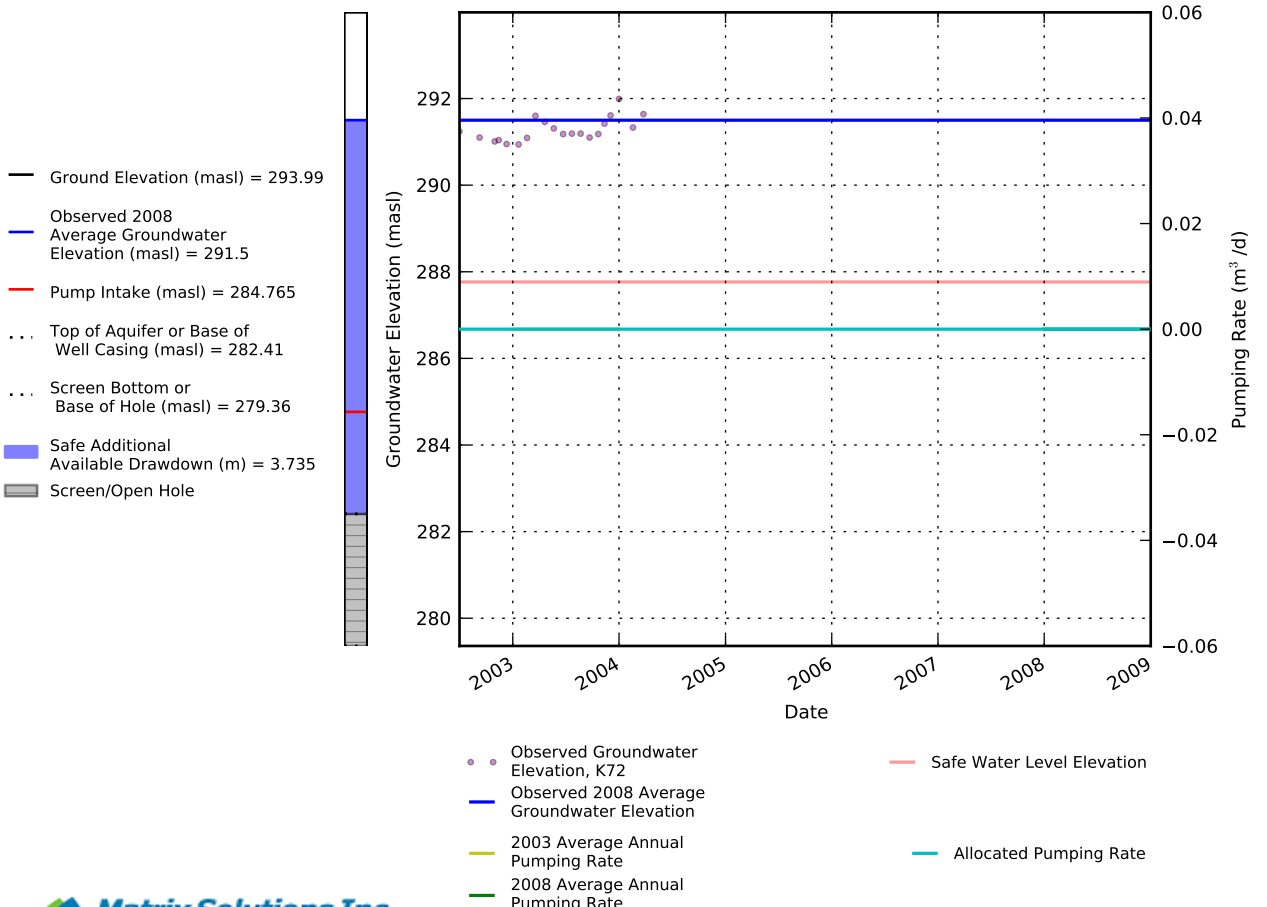

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Figure F29

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K73 / Obj_Num: 6505033

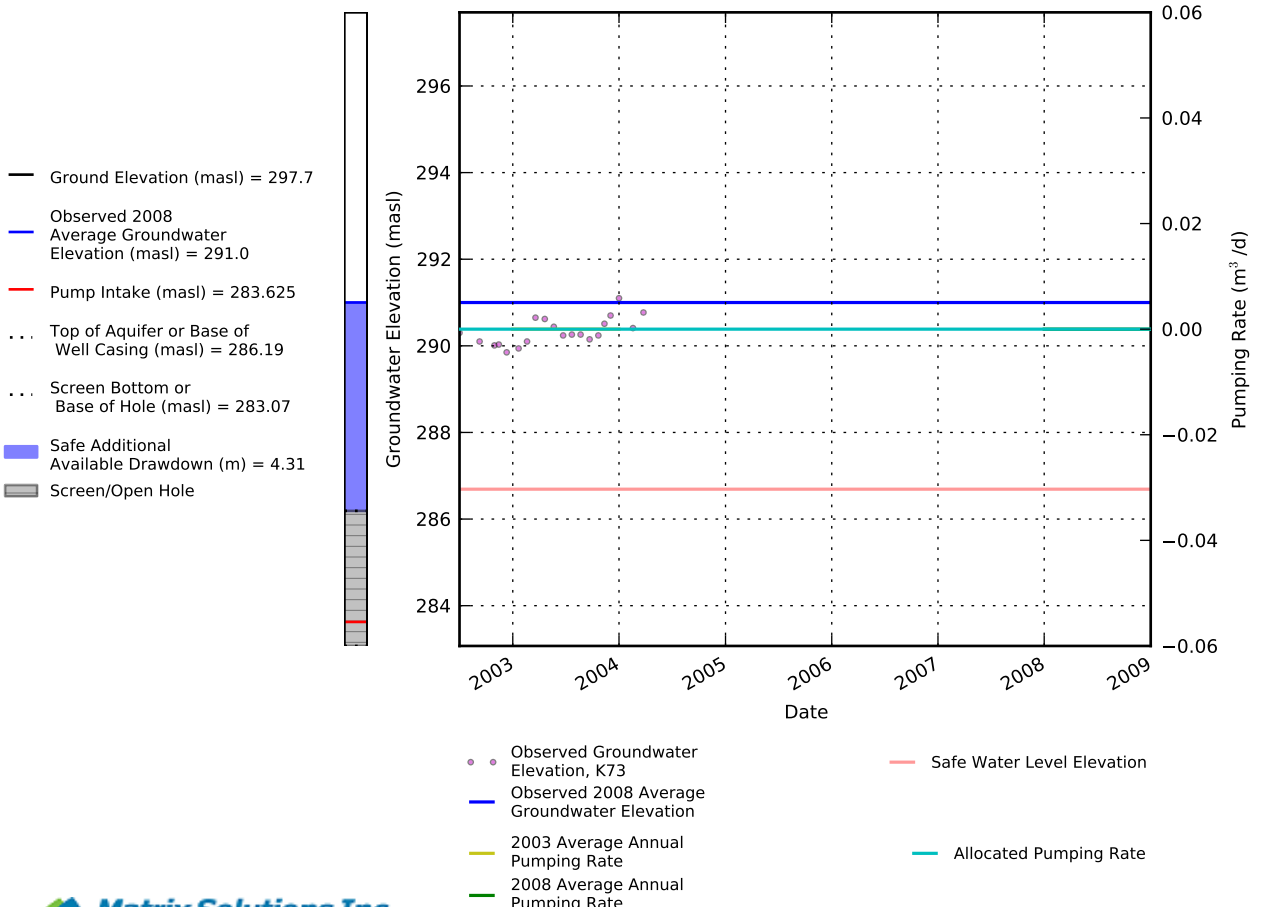

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Figure F30

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K74 / Obj_Num: 6505034

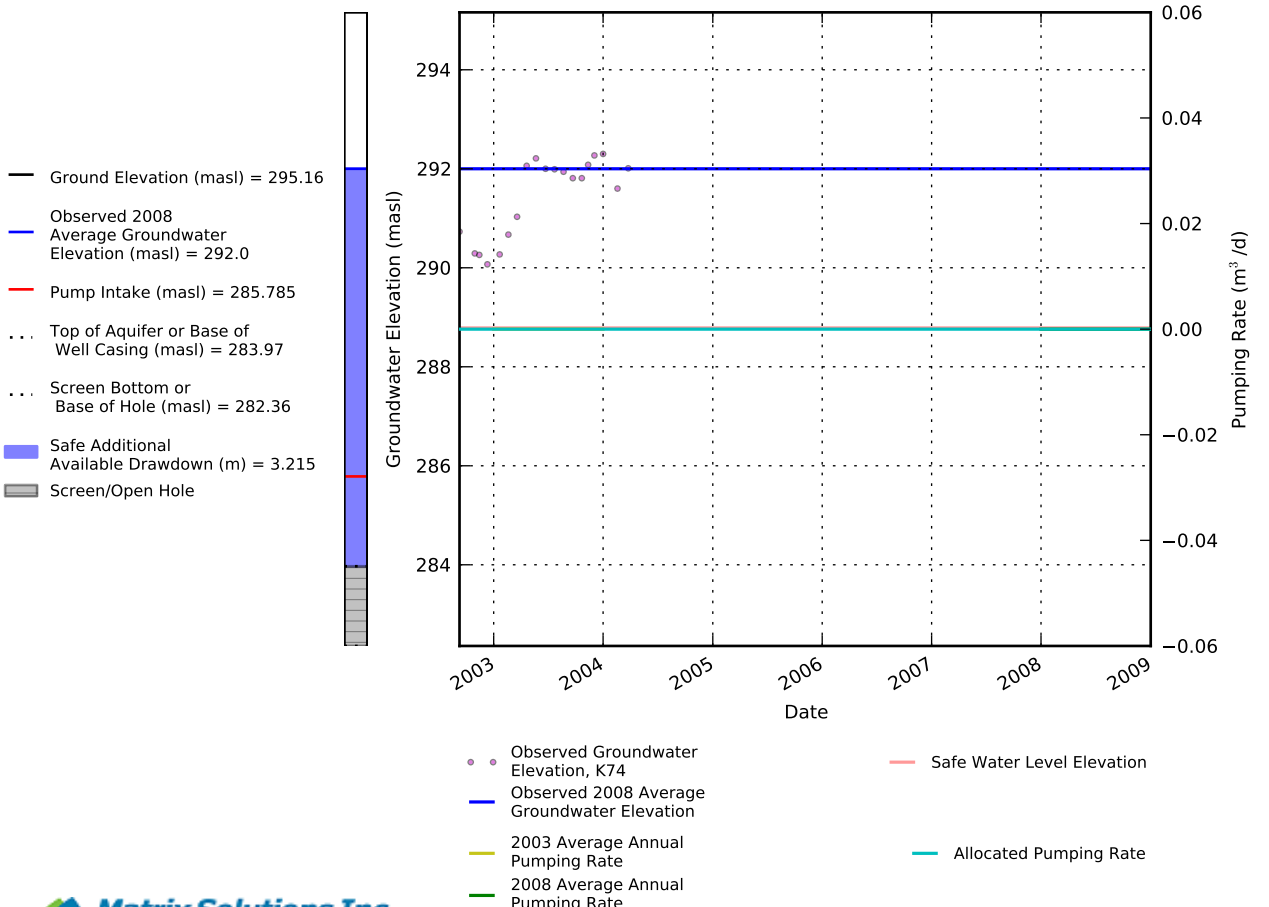

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Figure F31

HYDROGRAPH
City: Kitchener / Well Field: FORWELL/POMPEII
Consult_ID: K75 / Obj_Num: 6505035

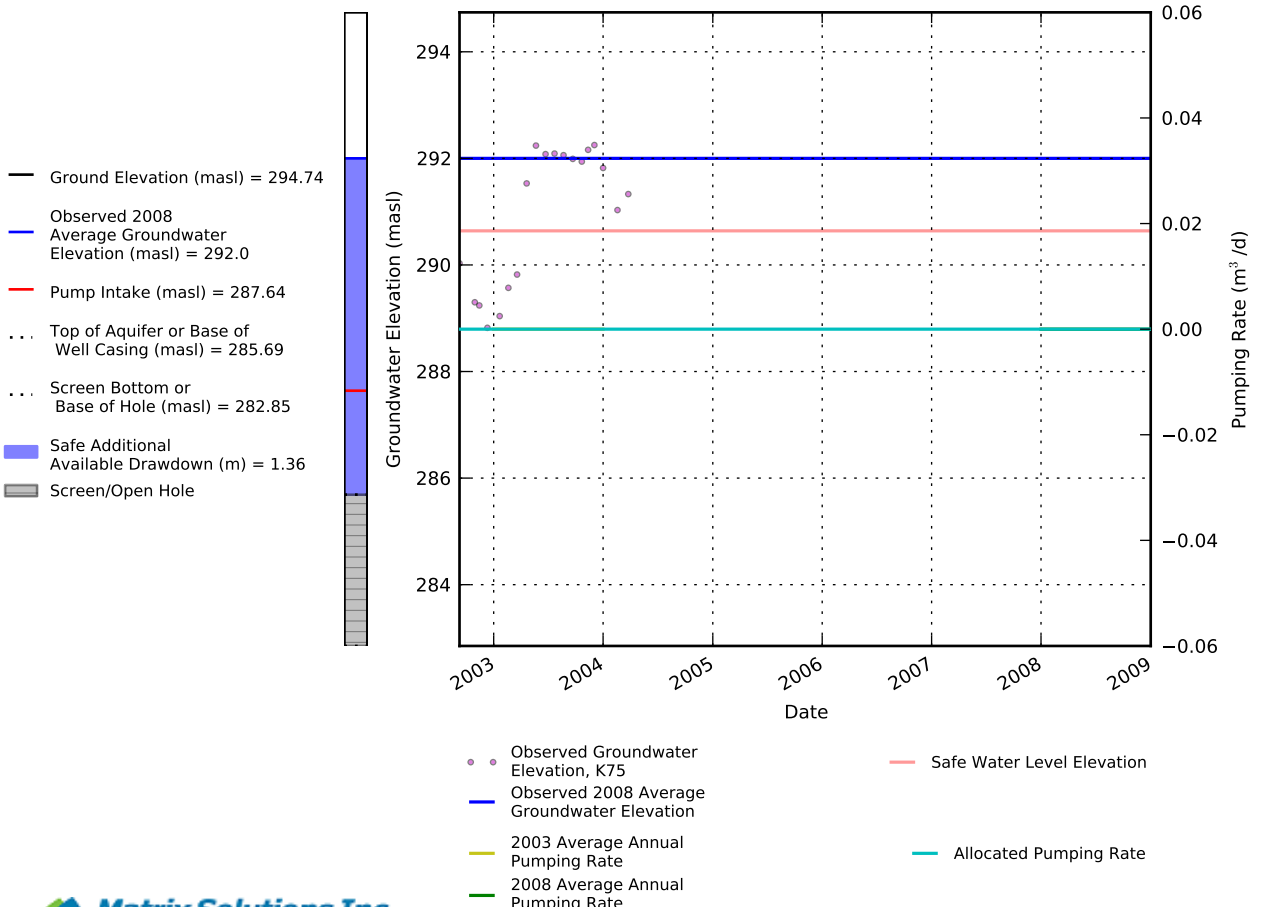

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Figure F32

HYDROGRAPH
City: Kitchener / Well Field: GREENBROOK
Consult_ID: K1 / Obj_Num: 1000034

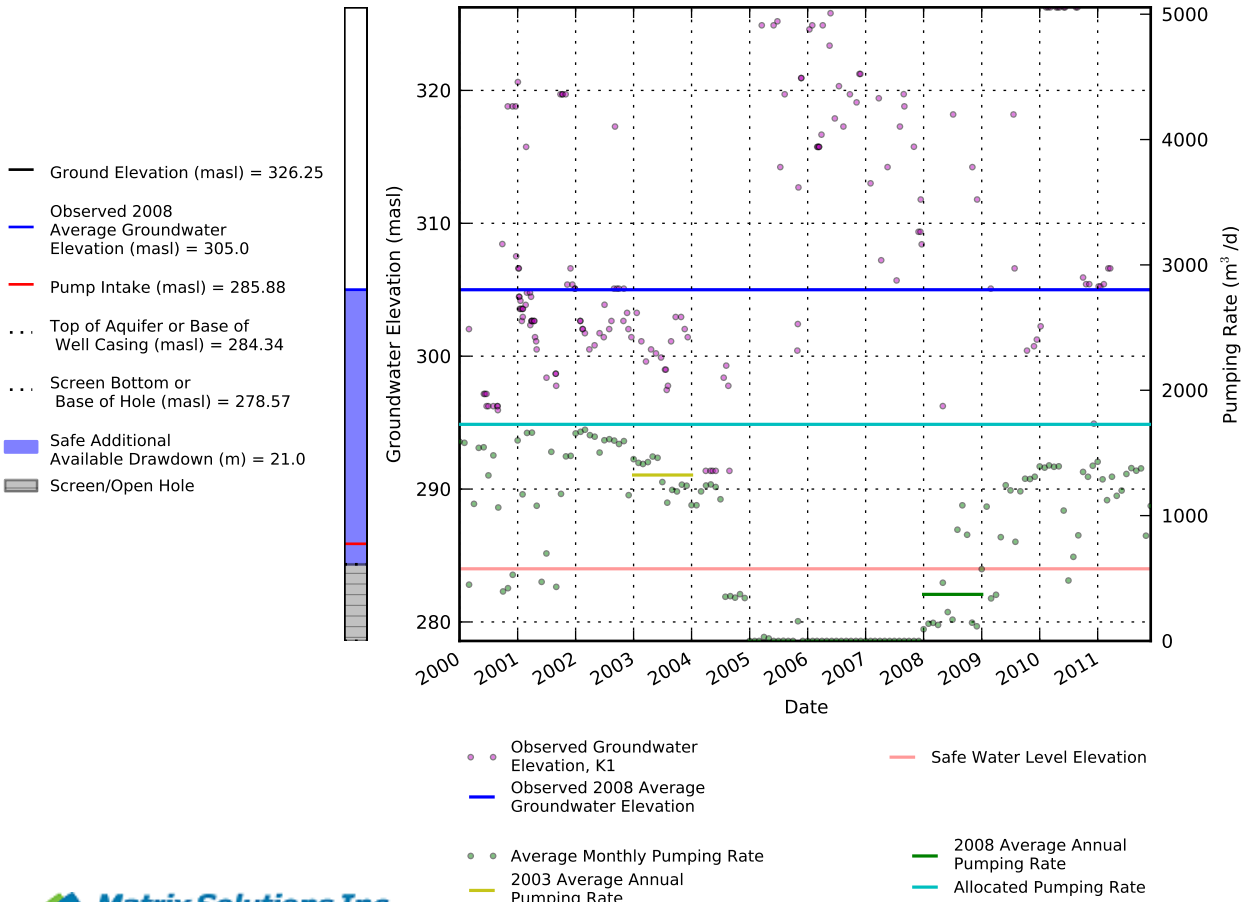

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Figure F33

HYDROGRAPH
City: Kitchener / Well Field: GREENBROOK
Consult_ID: K2 / Obj_Num: 1000003

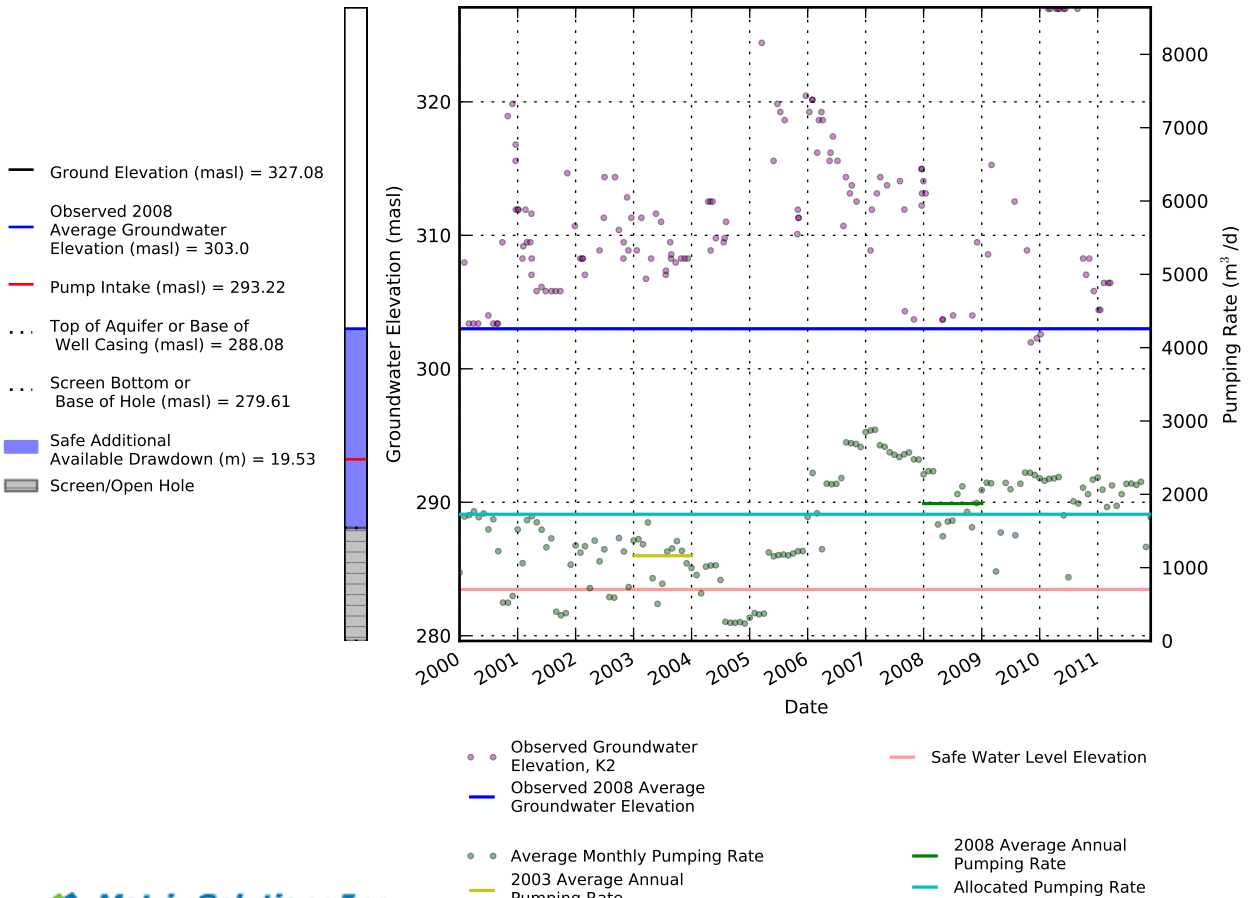

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Figure F34

HYDROGRAPH
City: Kitchener / Well Field: GREENBROOK
Consult_ID: K4B / Obj_Num: 9200014

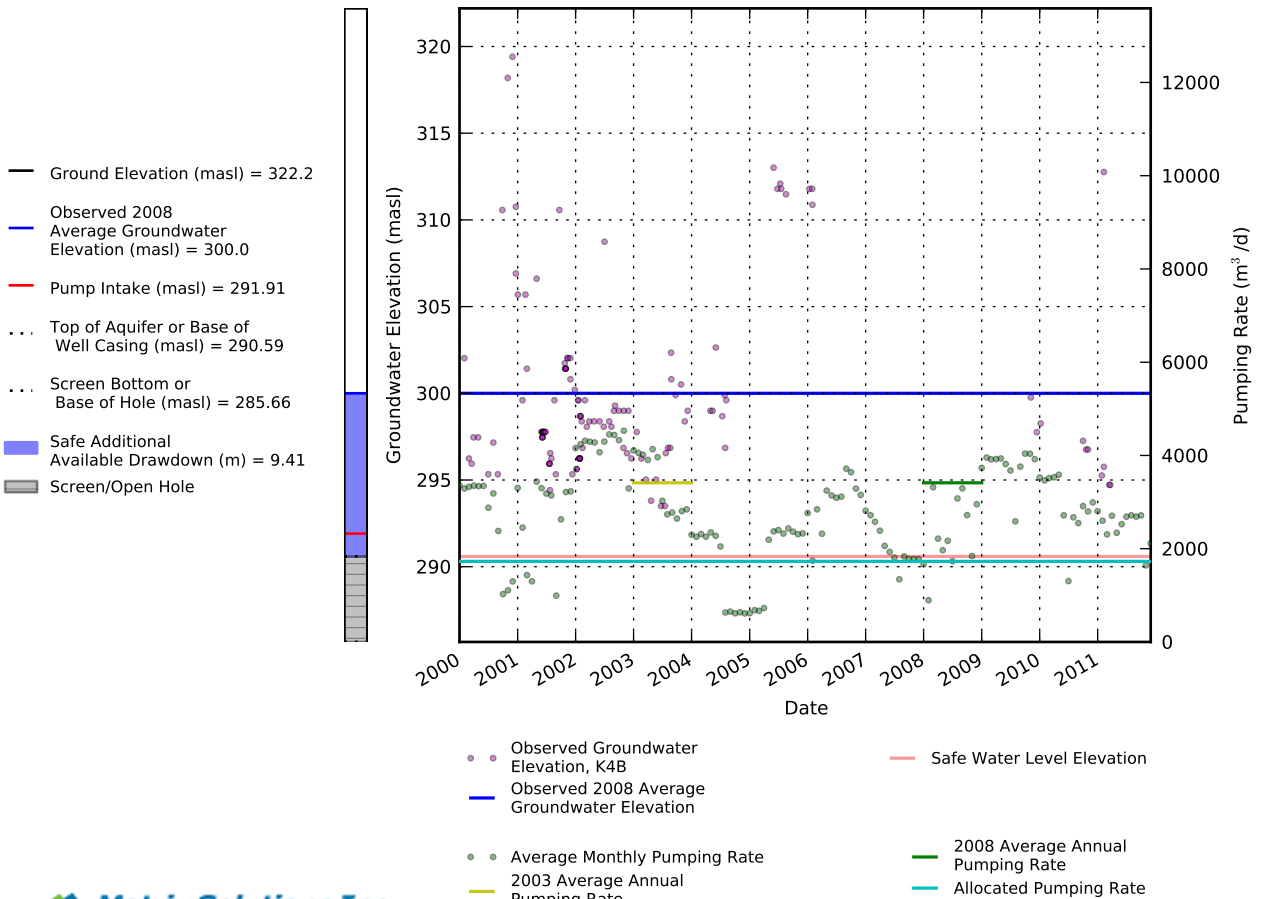

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Figure F35

HYDROGRAPH
City: Kitchener / Well Field: GREENBROOK
Consult_ID: K5A / Obj_Num: 9200915

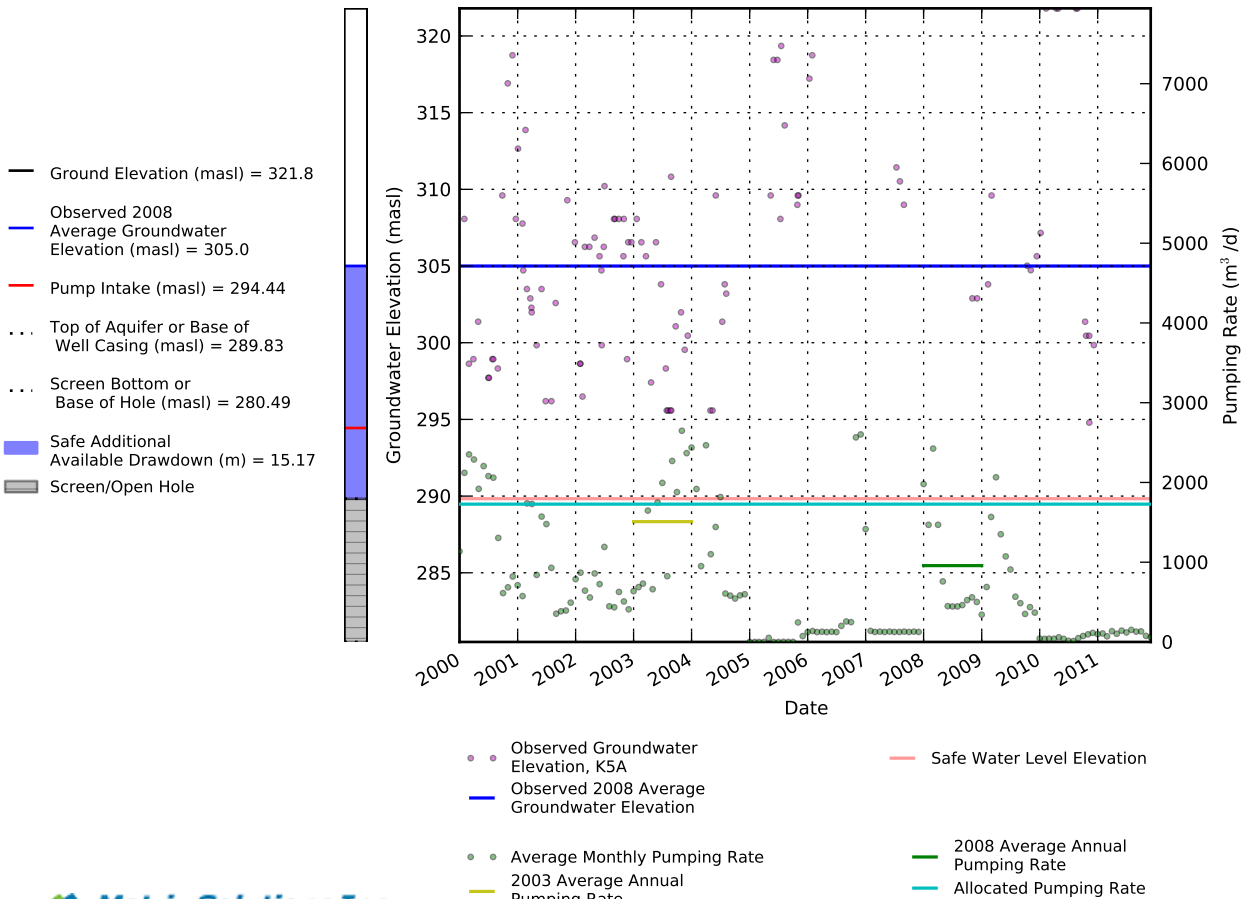

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Figure F36

HYDROGRAPH
City: Kitchener / Well Field: GREENBROOK
Consult_ID: K8 / Obj_Num: 1000834

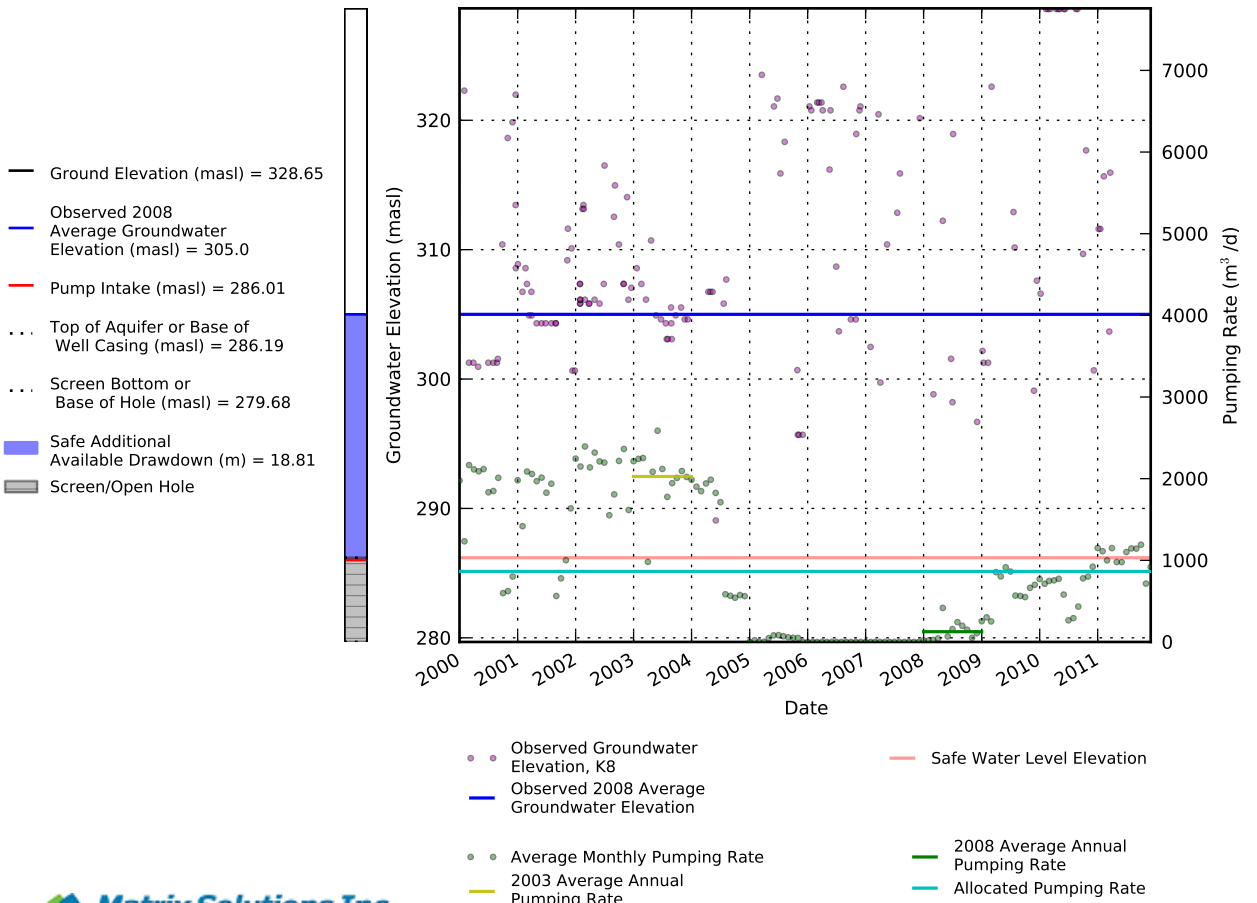

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Figure F37

HYDROGRAPH
City: Kitchener / Well Field: LANCASTER
Consult_ID: K41 / Obj_Num: 6500219

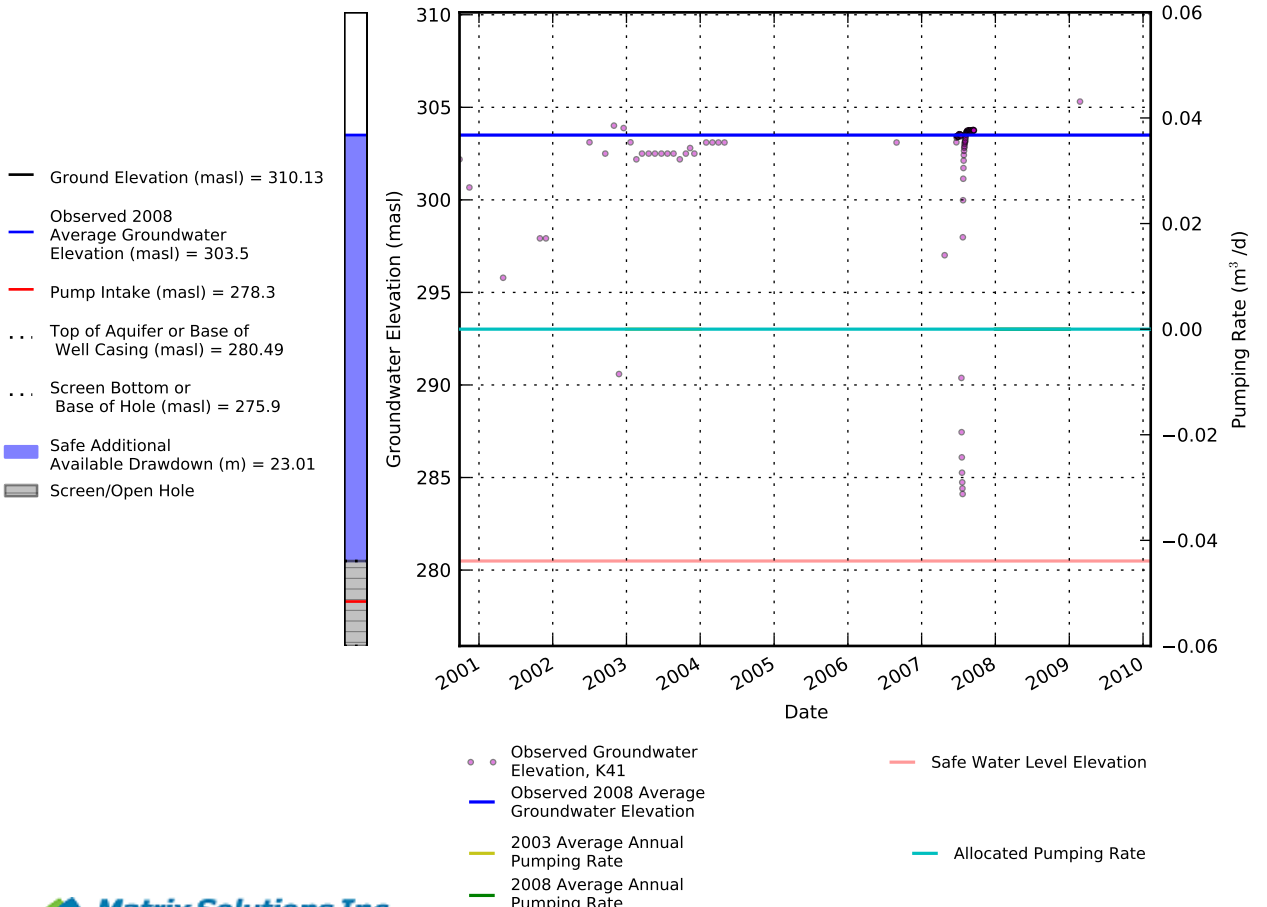

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Figure F38

HYDROGRAPH
City: Kitchener / Well Field: LANCASTER
Consult_ID: K42A / Obj_Num: 6500353

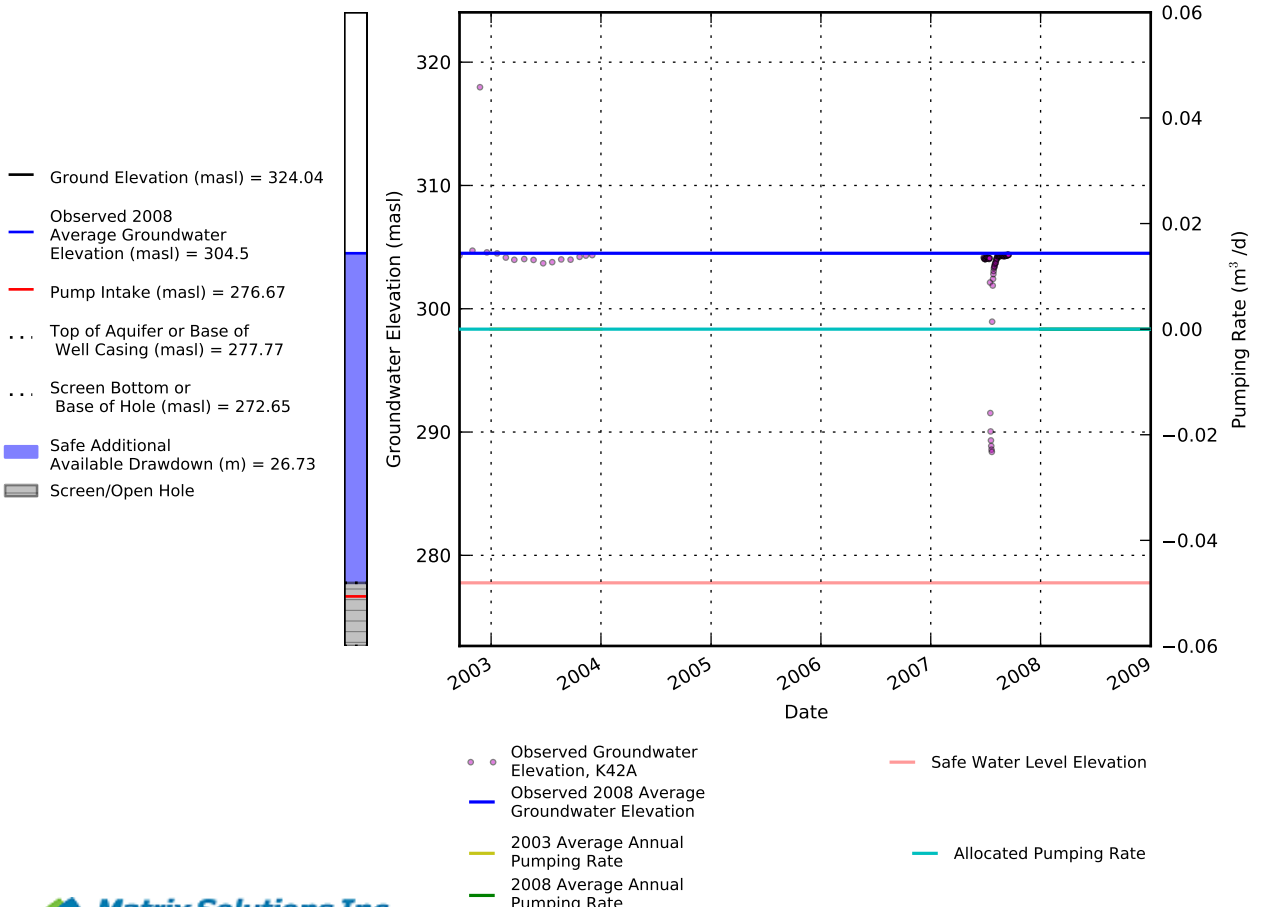

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Figure F39

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST
Consult_ID: K21 / Obj_Num: 6501407

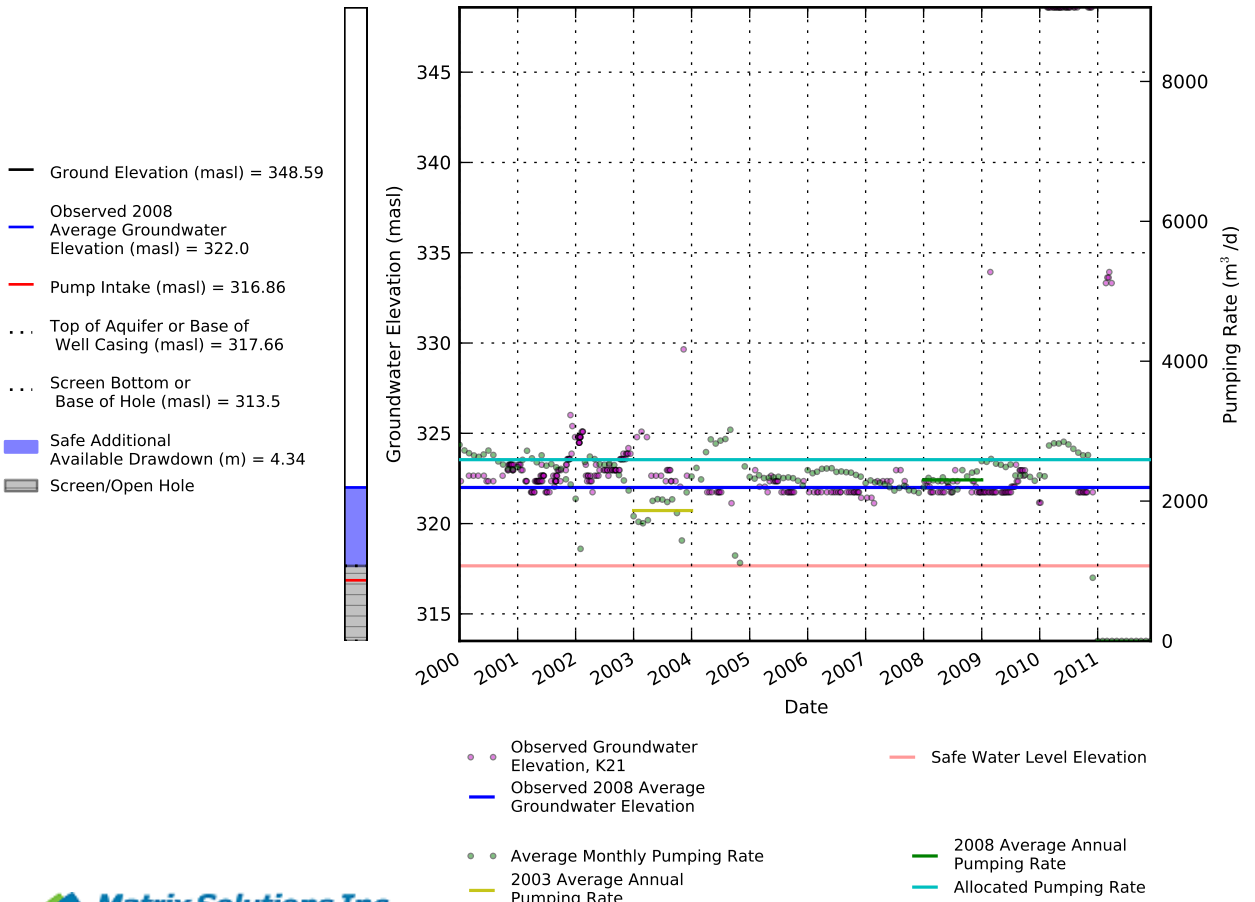

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Figure F40

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST
Consult_ID: K25 / Obj_Num: 6501807

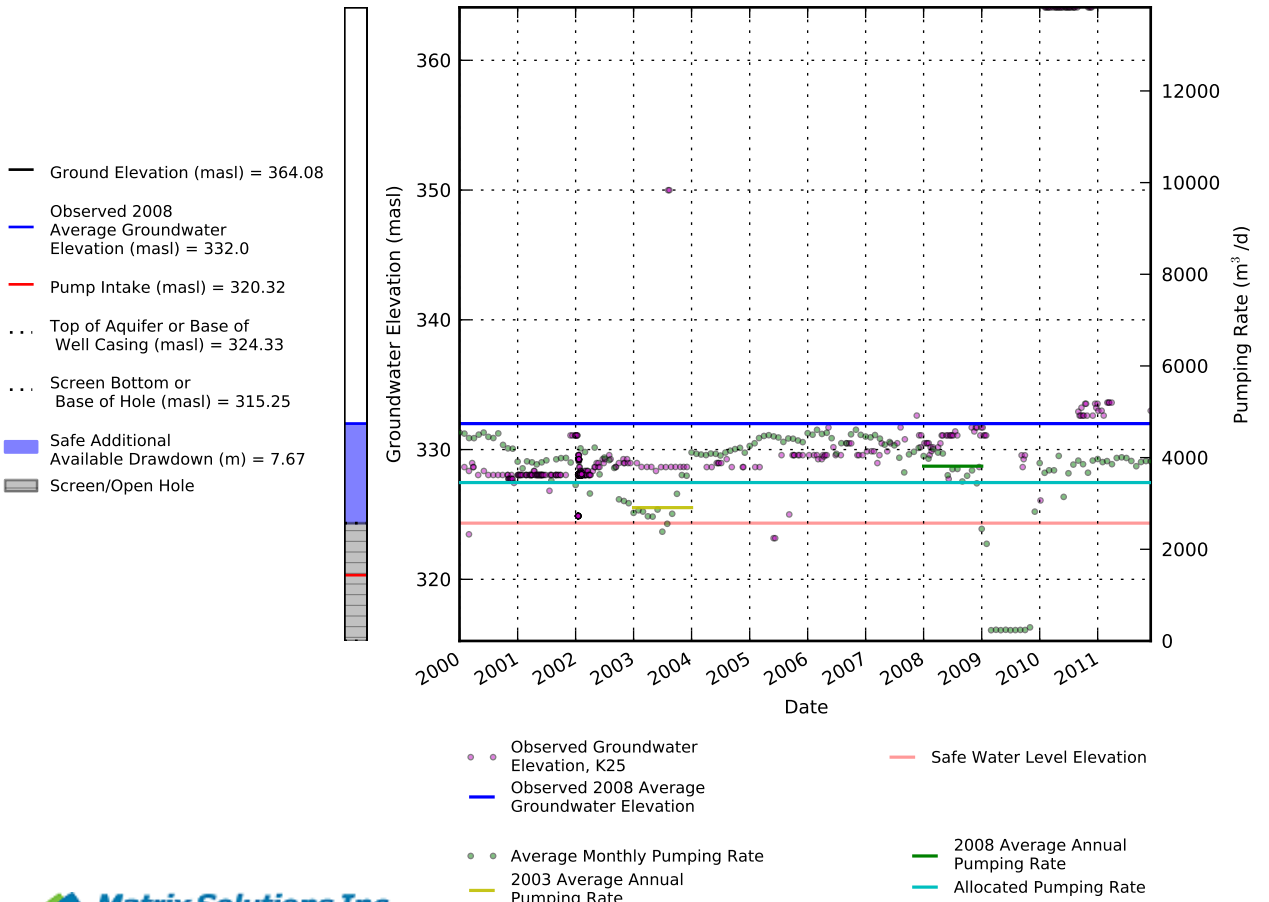

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Figure F41

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST
Consult_ID: K29 / Obj_Num: 6506310

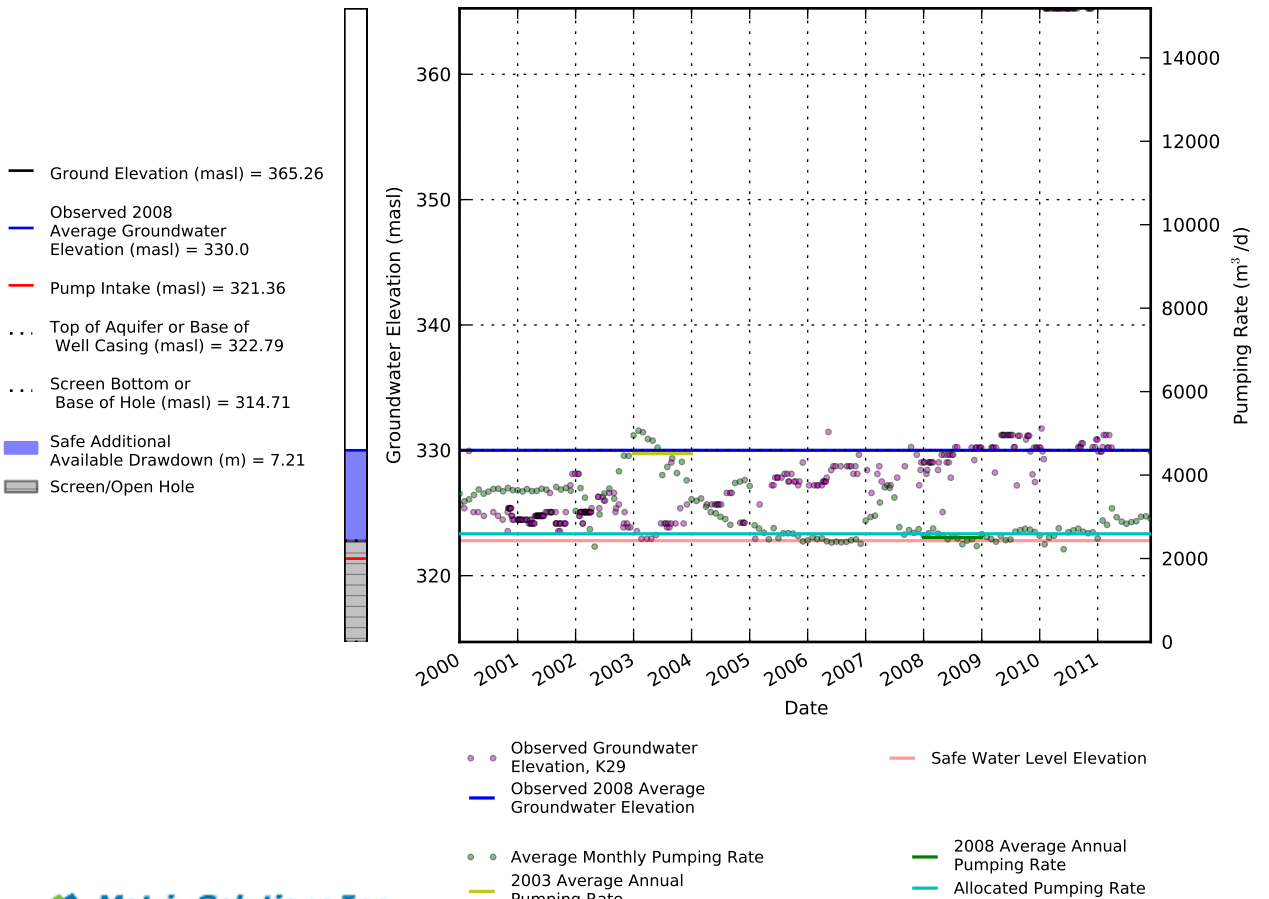

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Figure F42

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST PEAKING
Consult_ID: K91 / Obj_Num: 6506790

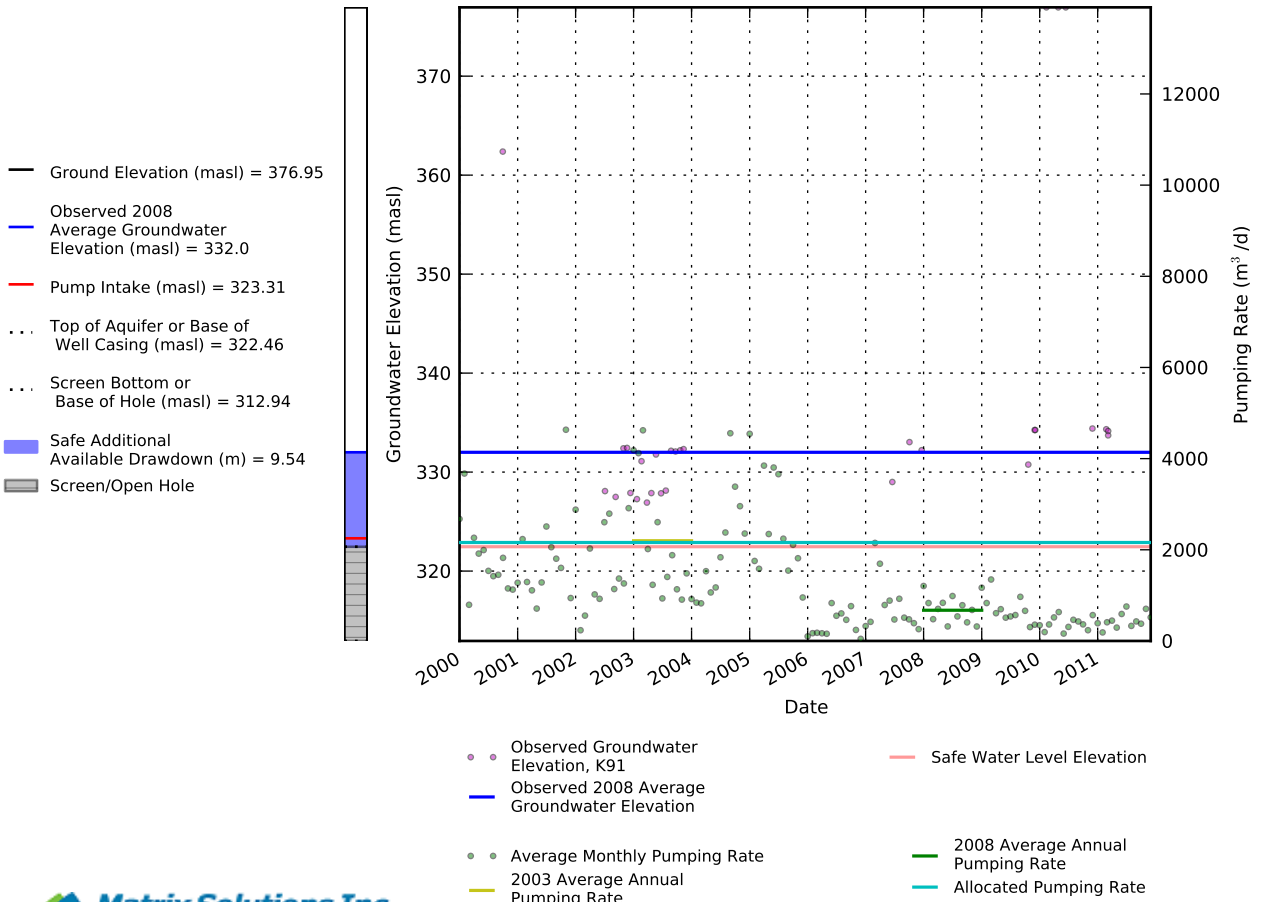

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Figure F43

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST PEAKING
Consult_ID: K92 / Obj_Num: 6506791

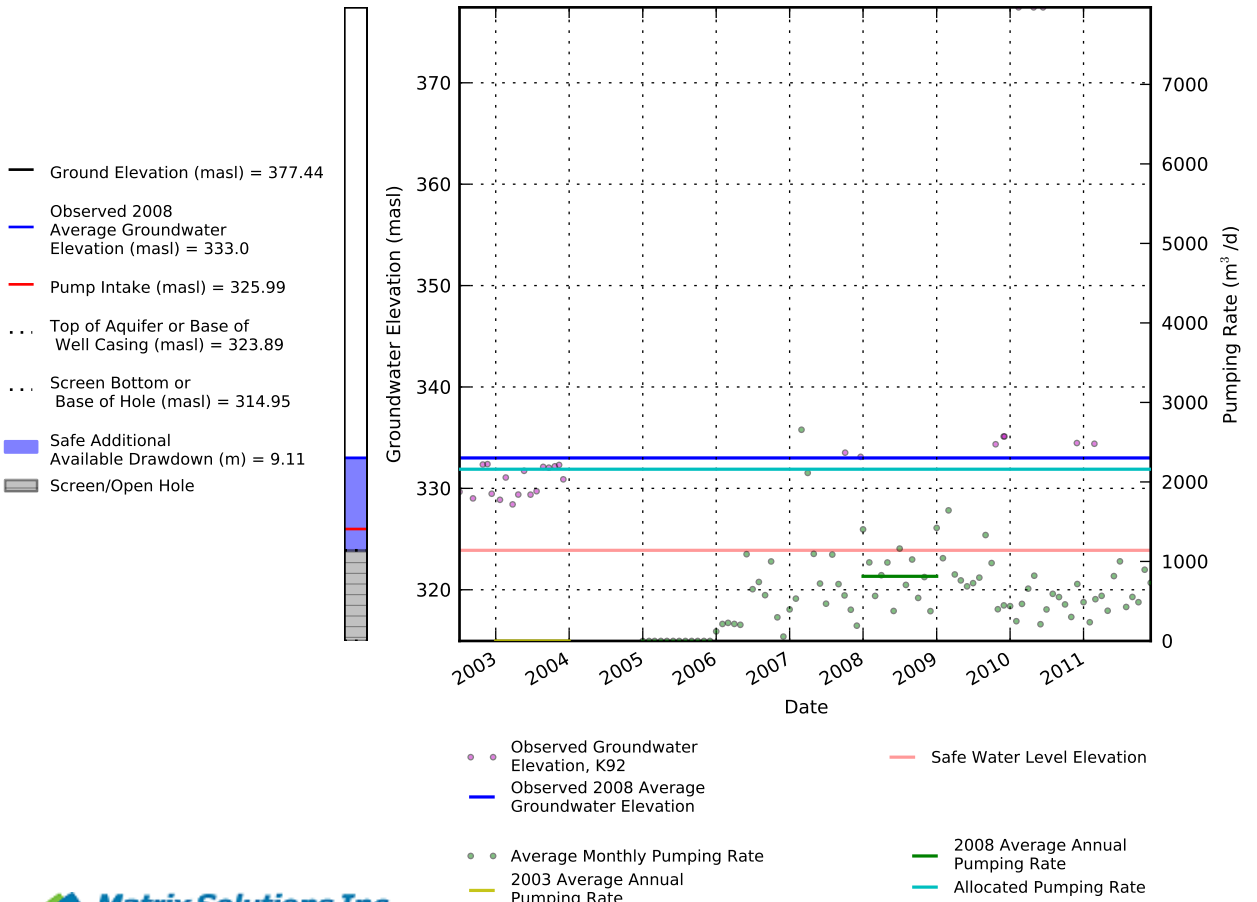

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Figure F44

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST PEAKING
Consult_ID: K93 / Obj_Num: 6506792

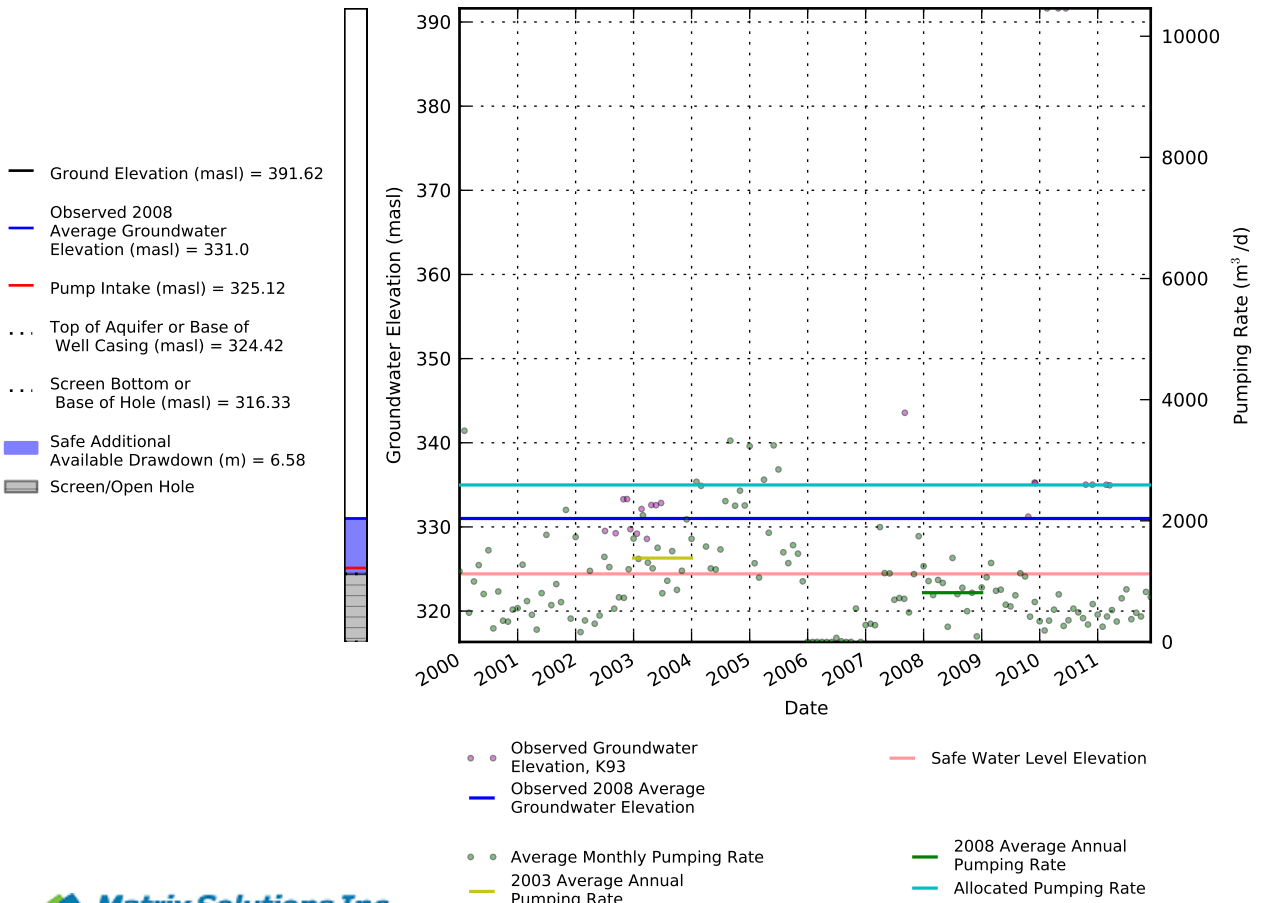

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Figure F45

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM EAST PEAKING
Consult_ID: K94 / Obj_Num: 6506789

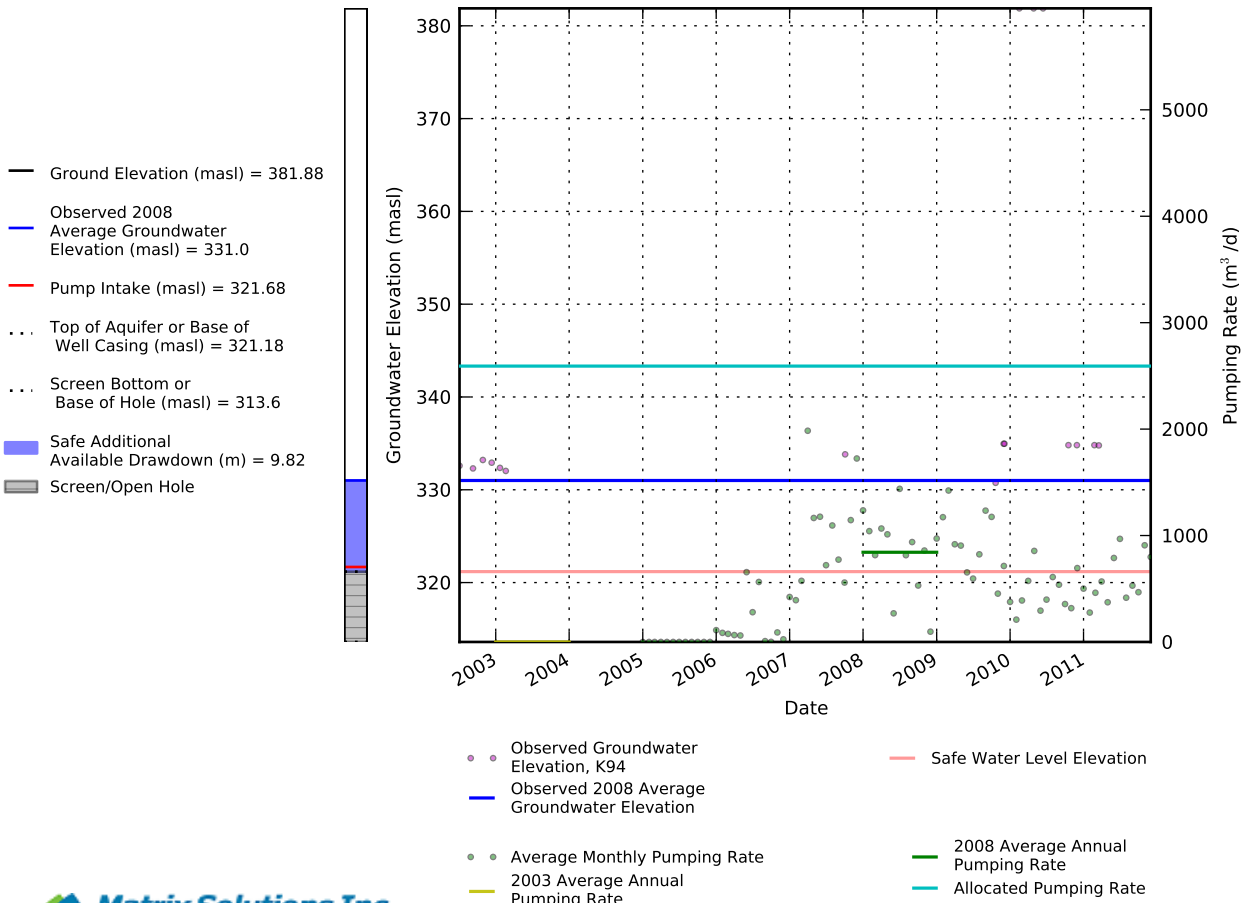

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Figure F46

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM WEST
Consult_ID: K22A / Obj_Num: 6502169

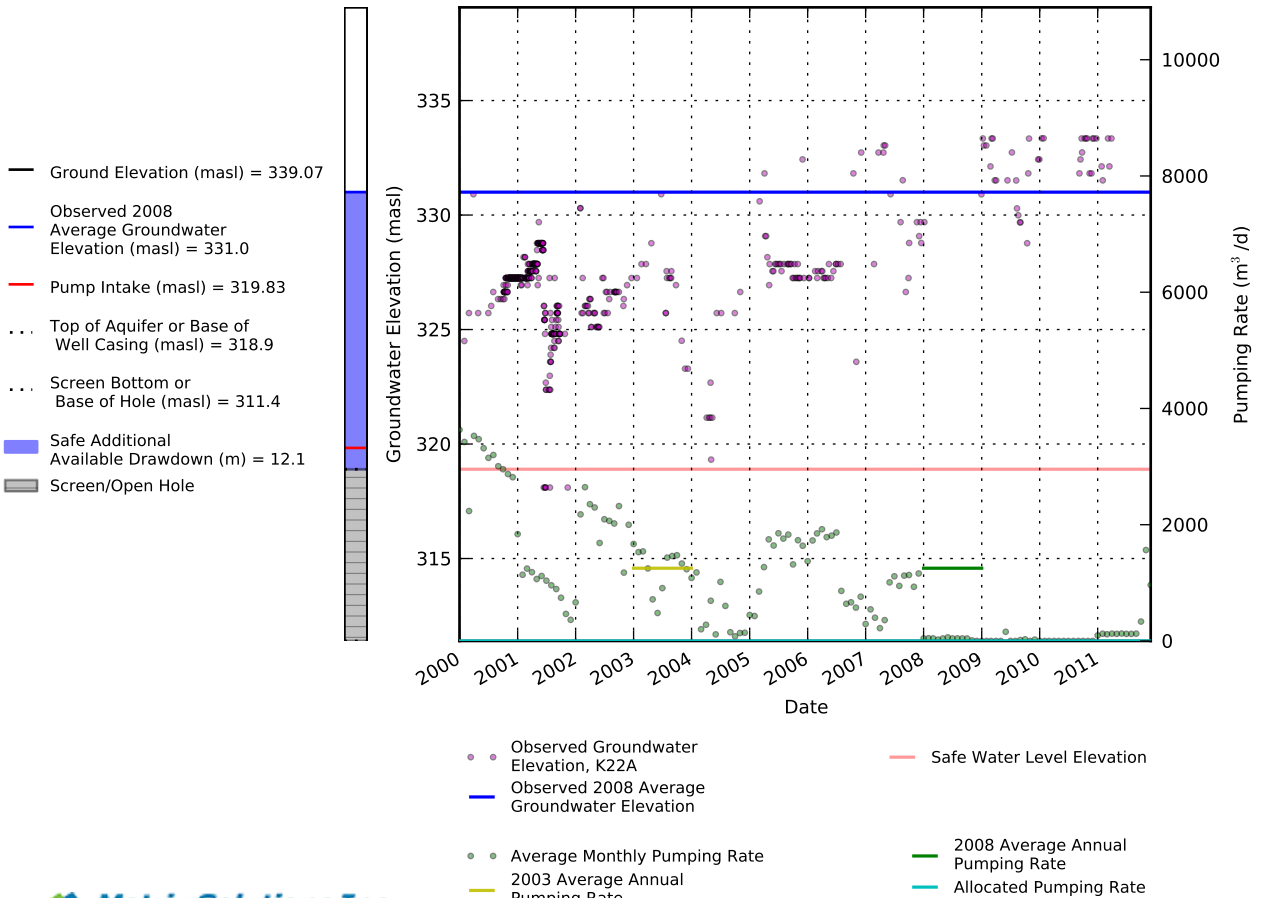

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Figure F47

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM WEST
Consult_ID: K23 / Obj_Num: 6502162

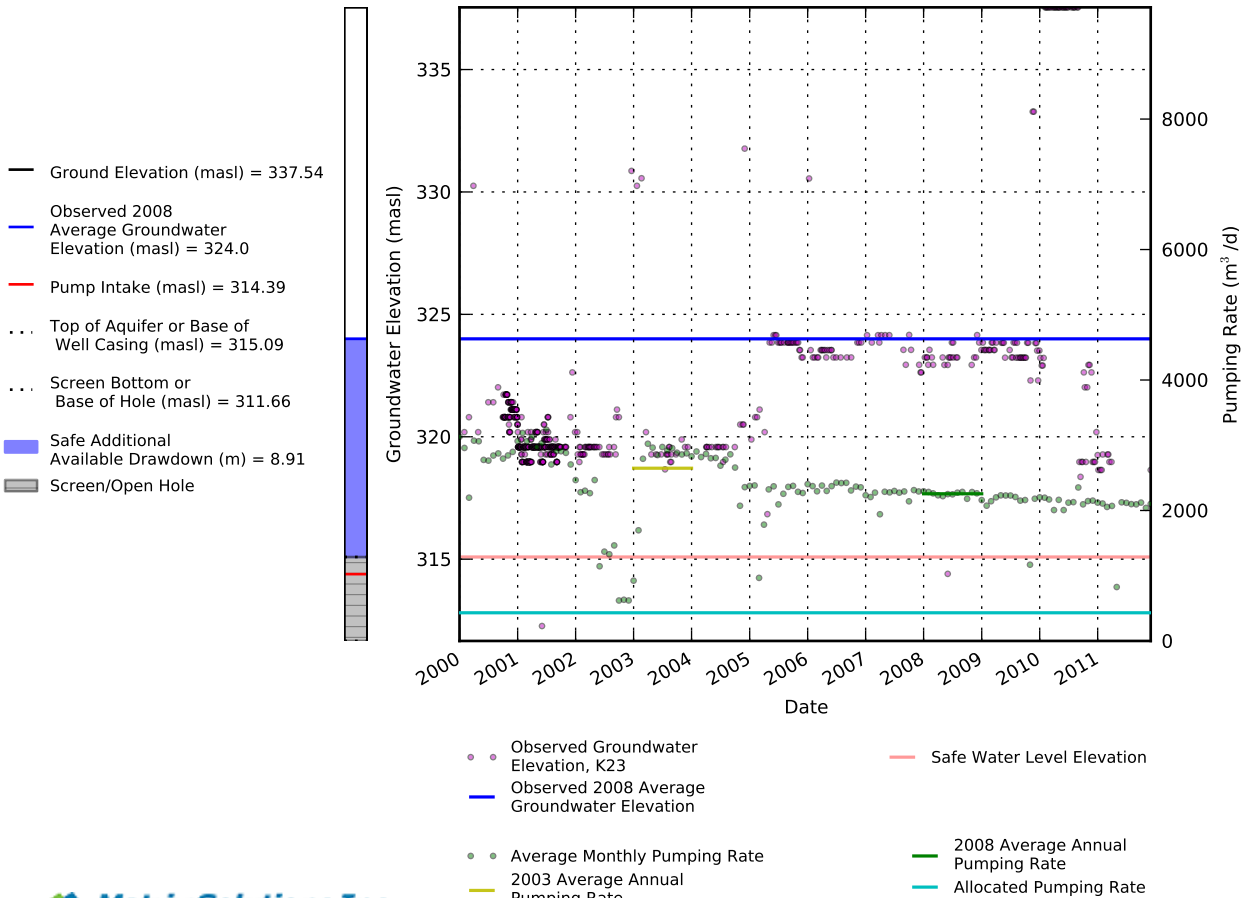

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Figure F48

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM WEST
Consult_ID: K24 / Obj_Num: 6502171

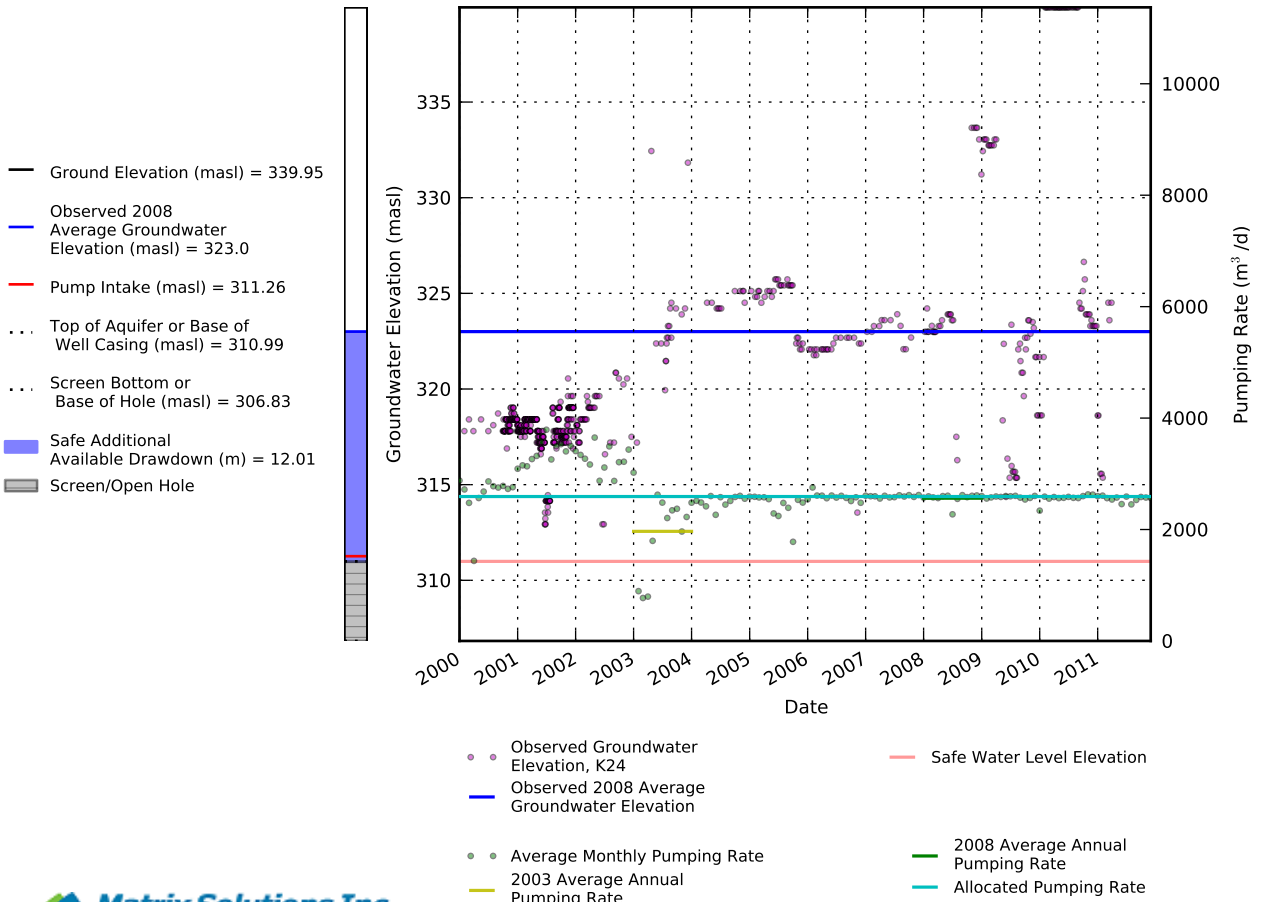

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Figure F49

HYDROGRAPH
City: Kitchener / Well Field: MANNHEIM WEST
Consult_ID: K26 / Obj_Num: 6503145

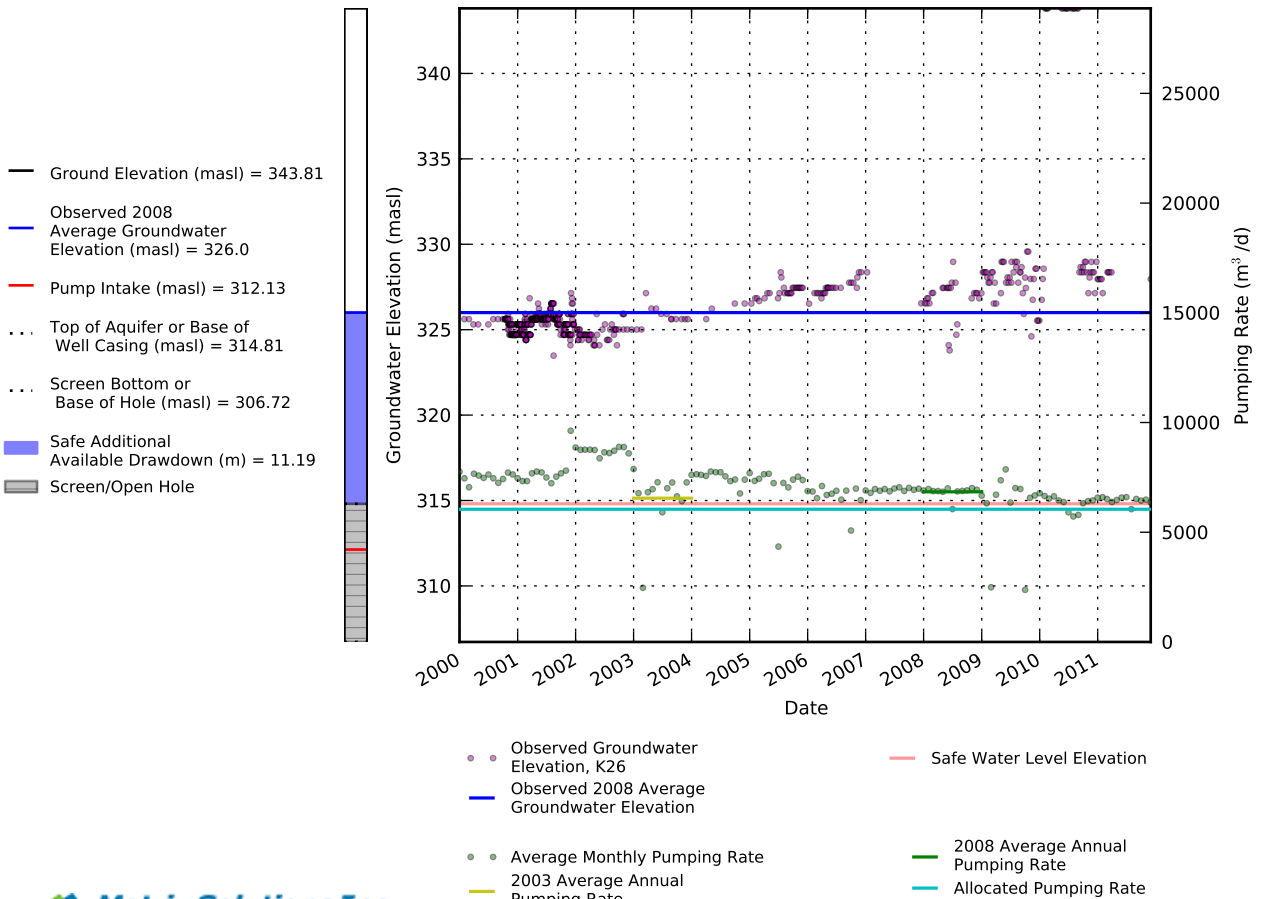

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Figure F50

HYDROGRAPH
City: Kitchener / Well Field: PARKWAY
Consult_ID: K31 / Obj_Num: 6500292

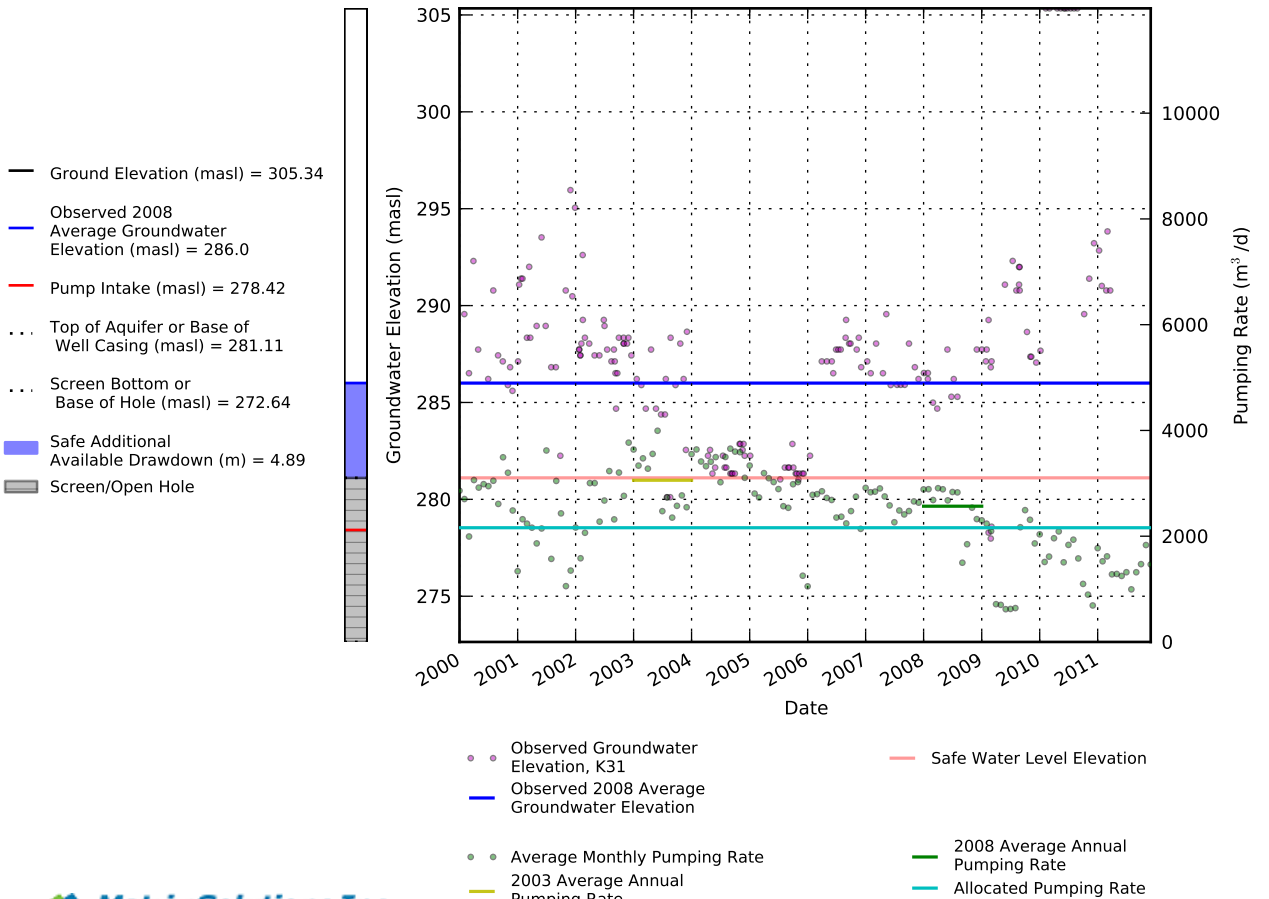

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Figure F51

HYDROGRAPH
City: Kitchener / Well Field: PARKWAY
Consult_ID: K32 / Obj_Num: 9200016

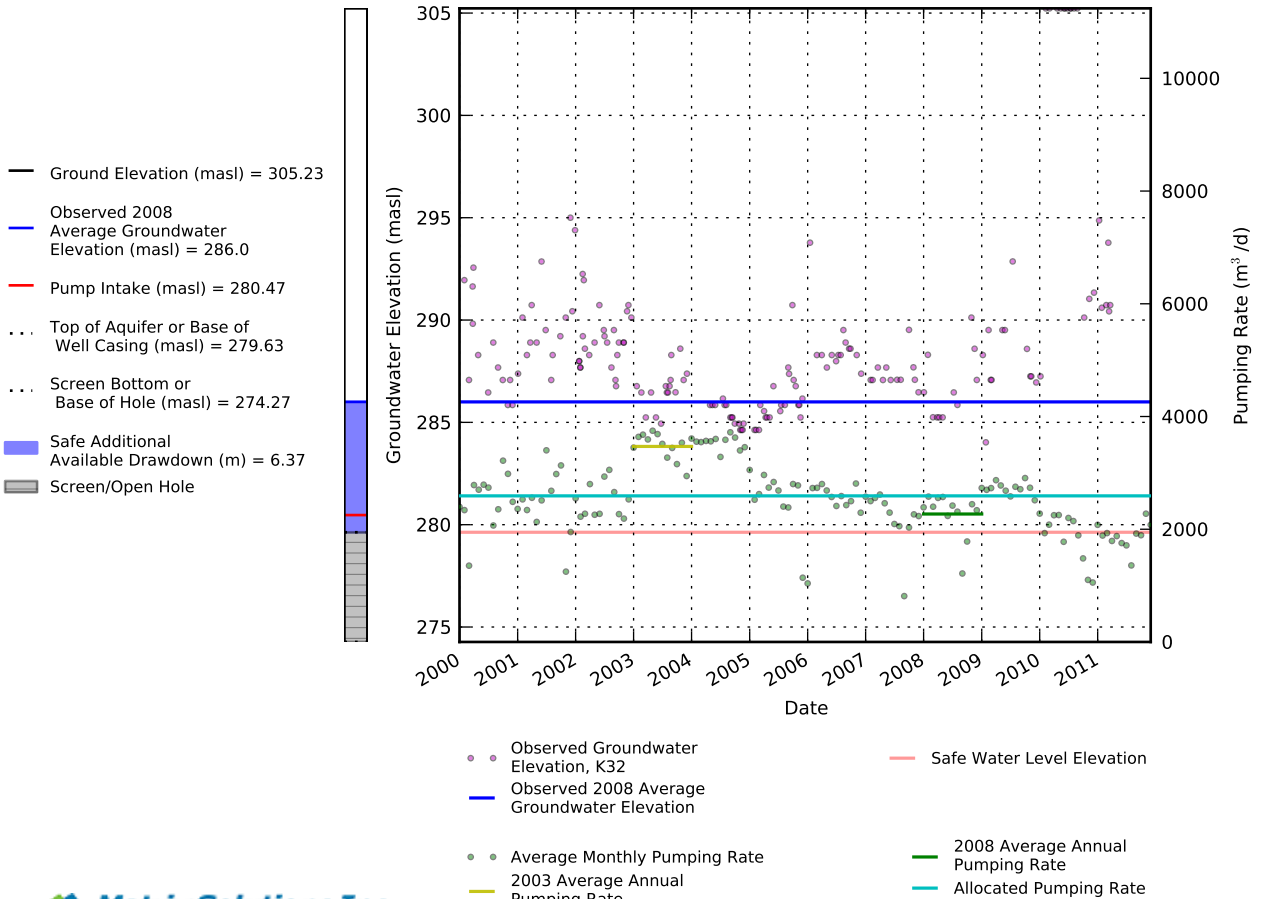

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Figure F52

HYDROGRAPH
City: Kitchener / Well Field: PARKWAY
Consult_ID: K33 / Obj_Num: 6500352

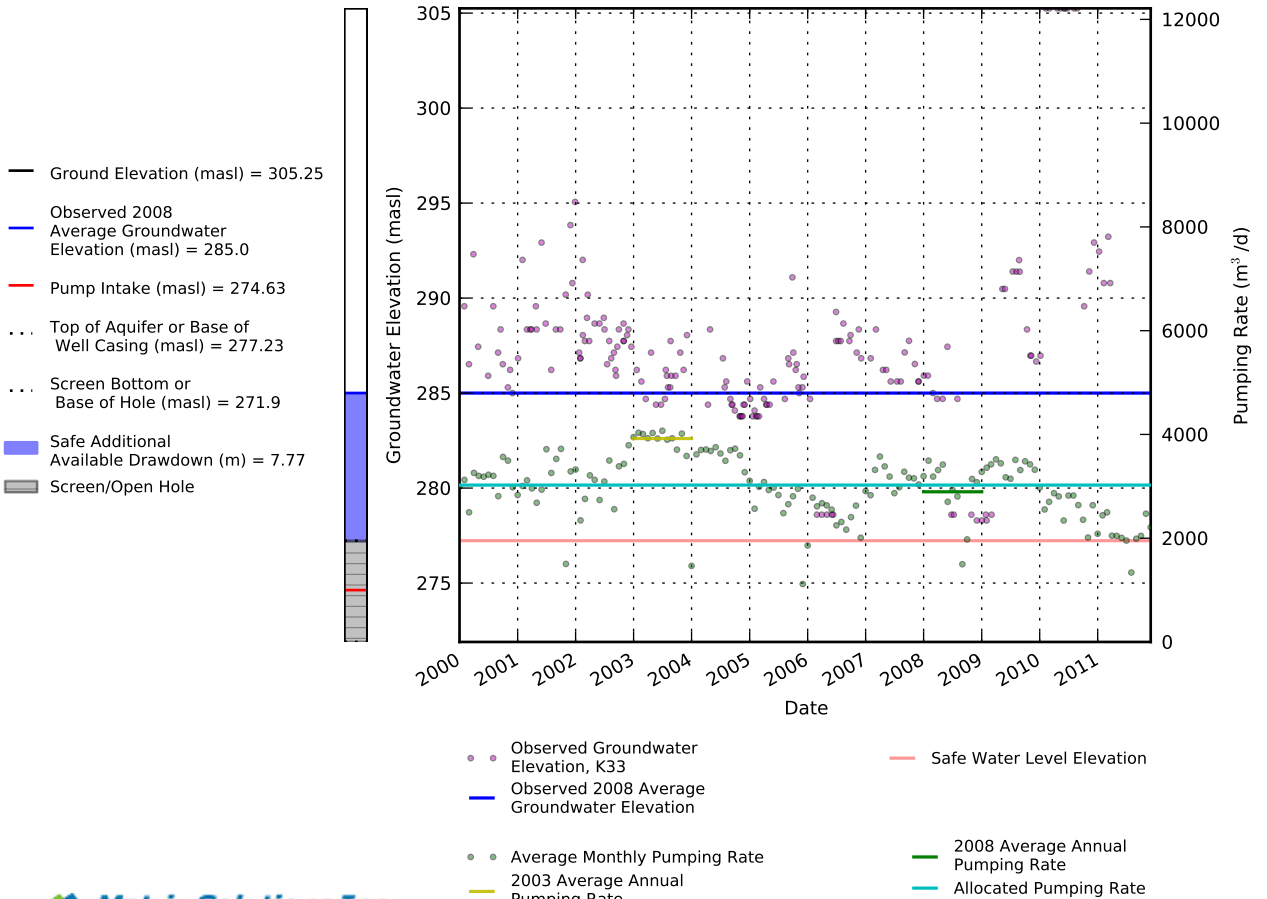

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Figure F53

HYDROGRAPH
City: Kitchener / Well Field: STRANGE STREET
Consult_ID: K10A / Obj_Num: 6505373

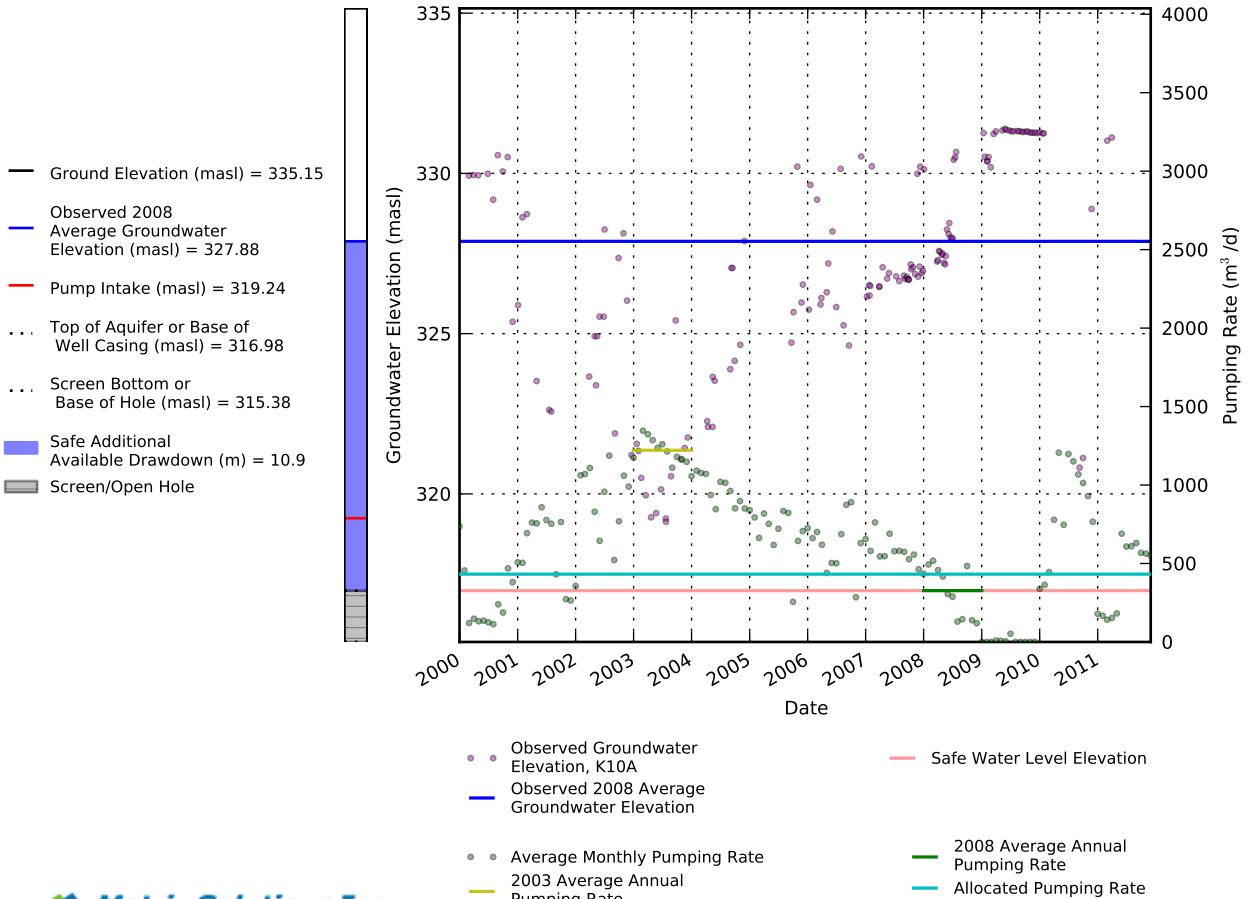

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Figure F54

HYDROGRAPH
City: Kitchener / Well Field: STRANGE STREET
Consult_ID: K11 / Obj_Num: 1000037

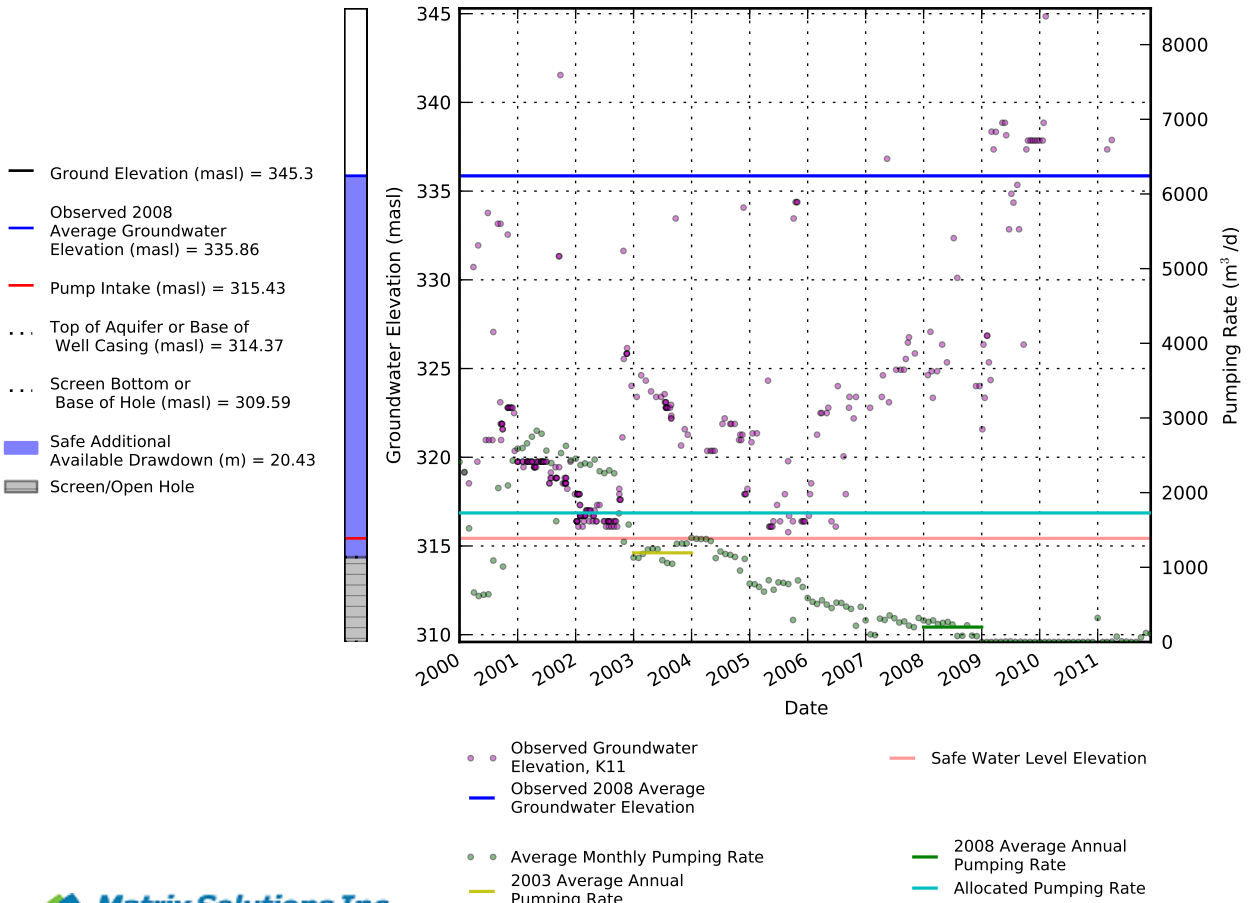

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Figure F55

HYDROGRAPH
City: Kitchener / Well Field: STRANGE STREET
Consult_ID: K13 / Obj_Num: 6500193

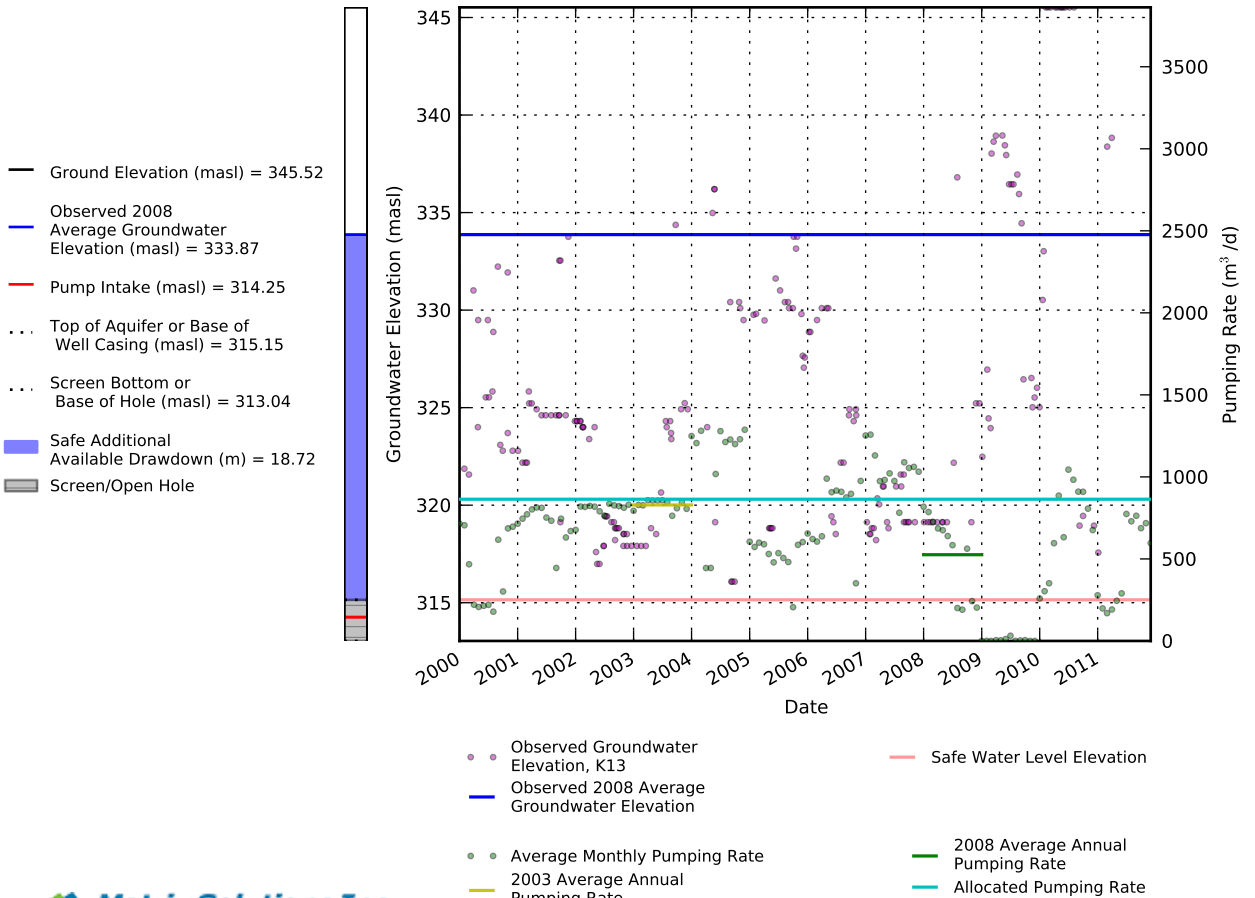

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Figure F56

HYDROGRAPH
City: Kitchener / Well Field: STRANGE STREET
Consult_ID: K18 / Obj_Num: 6504268

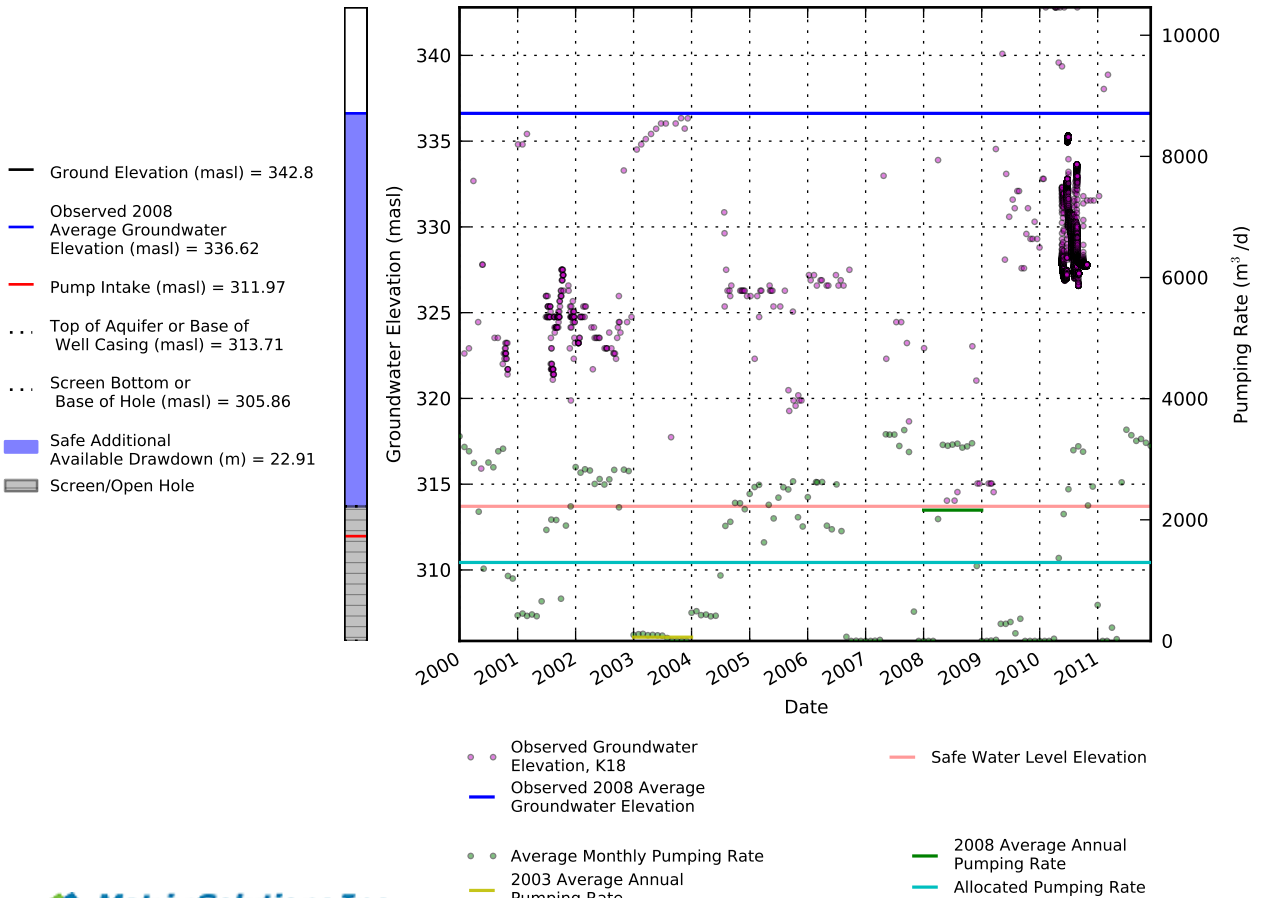

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Figure F57

HYDROGRAPH
City: Kitchener / Well Field: STRANGE STREET
Consult_ID: K19 / Obj_Num: 9201549

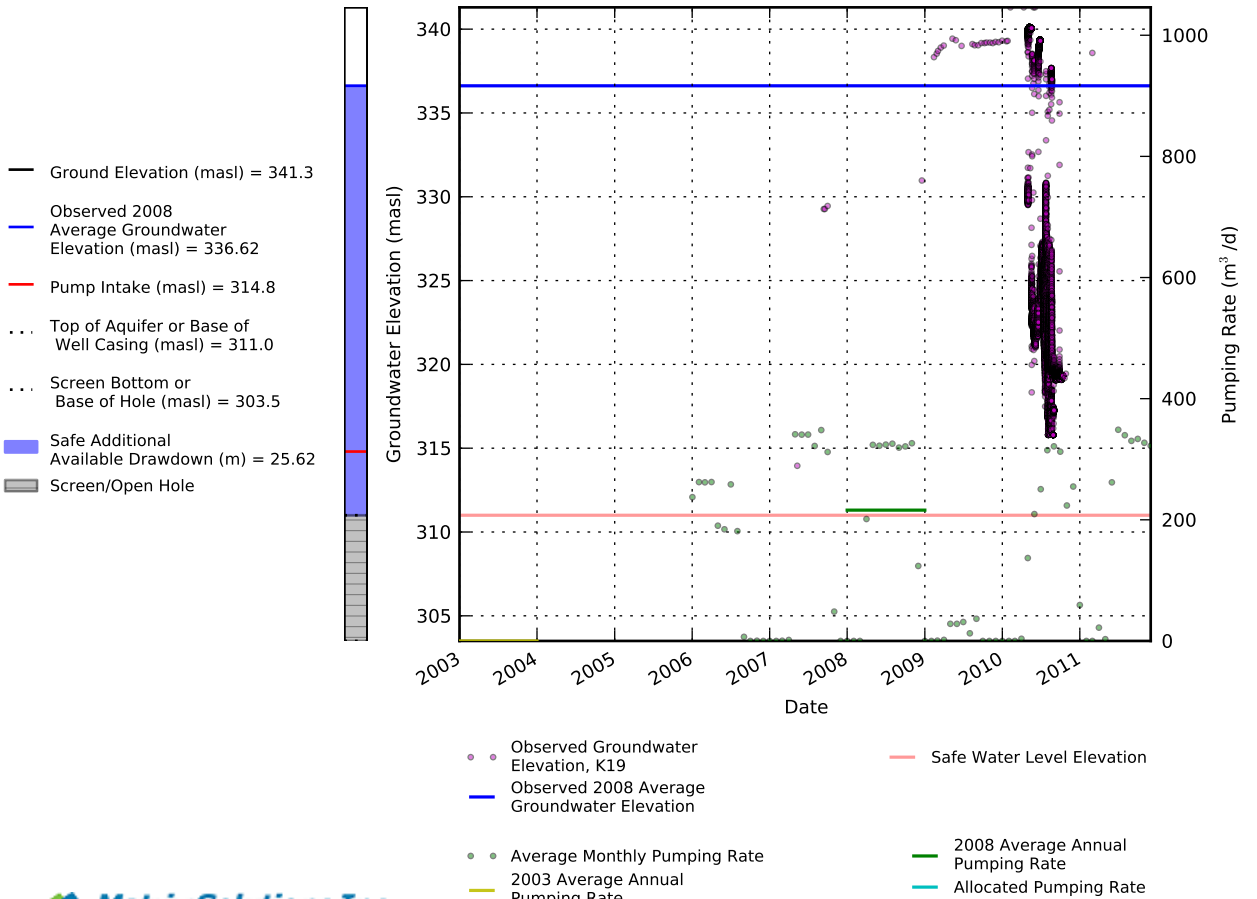

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Figure F58

HYDROGRAPH
City: Kitchener / Well Field: STRASBURG
Consult_ID: K34 / Obj_Num: 6500921

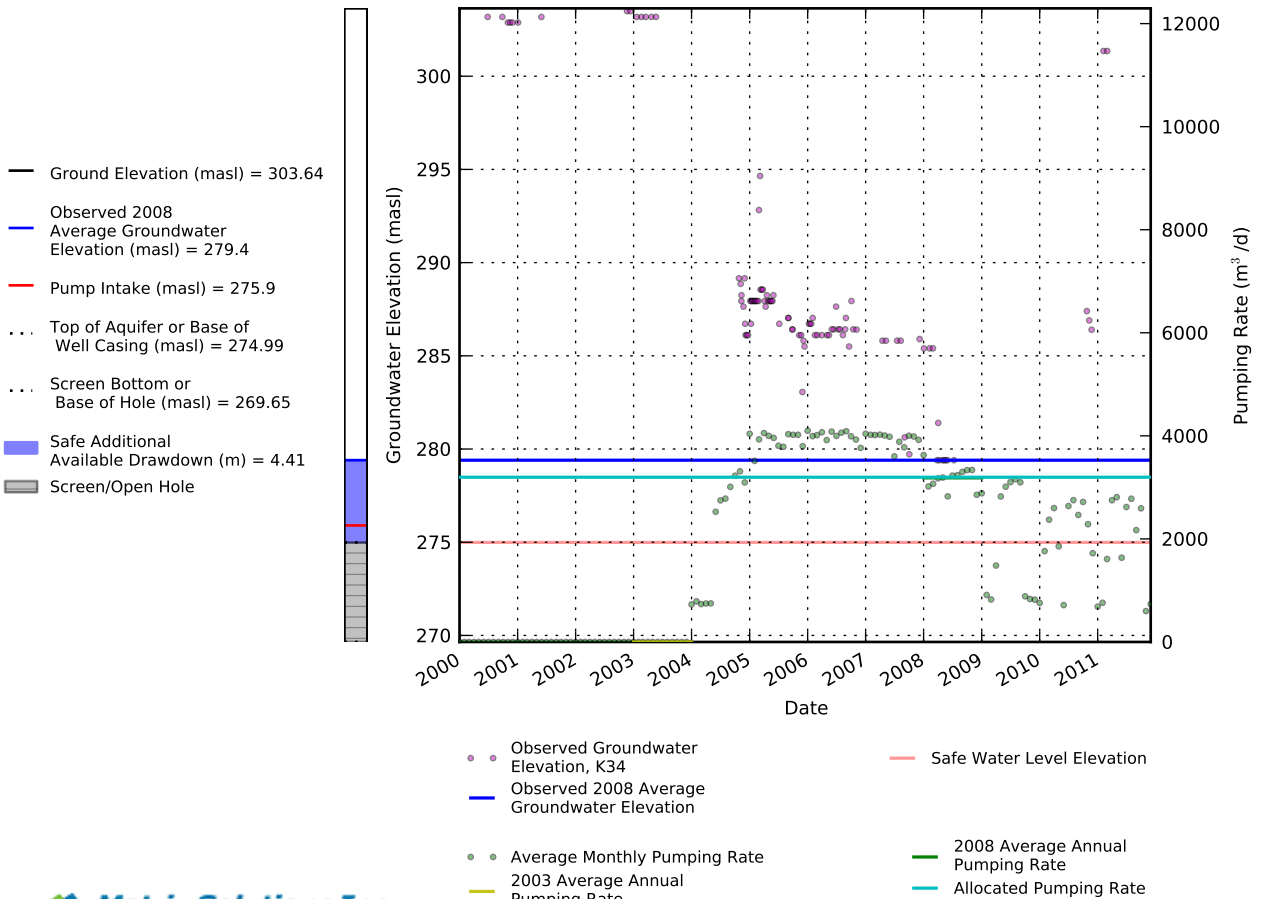

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Figure F59

HYDROGRAPH
City: Kitchener / Well Field: STRASBURG
Consult_ID: K36 / Obj_Num: 6506160

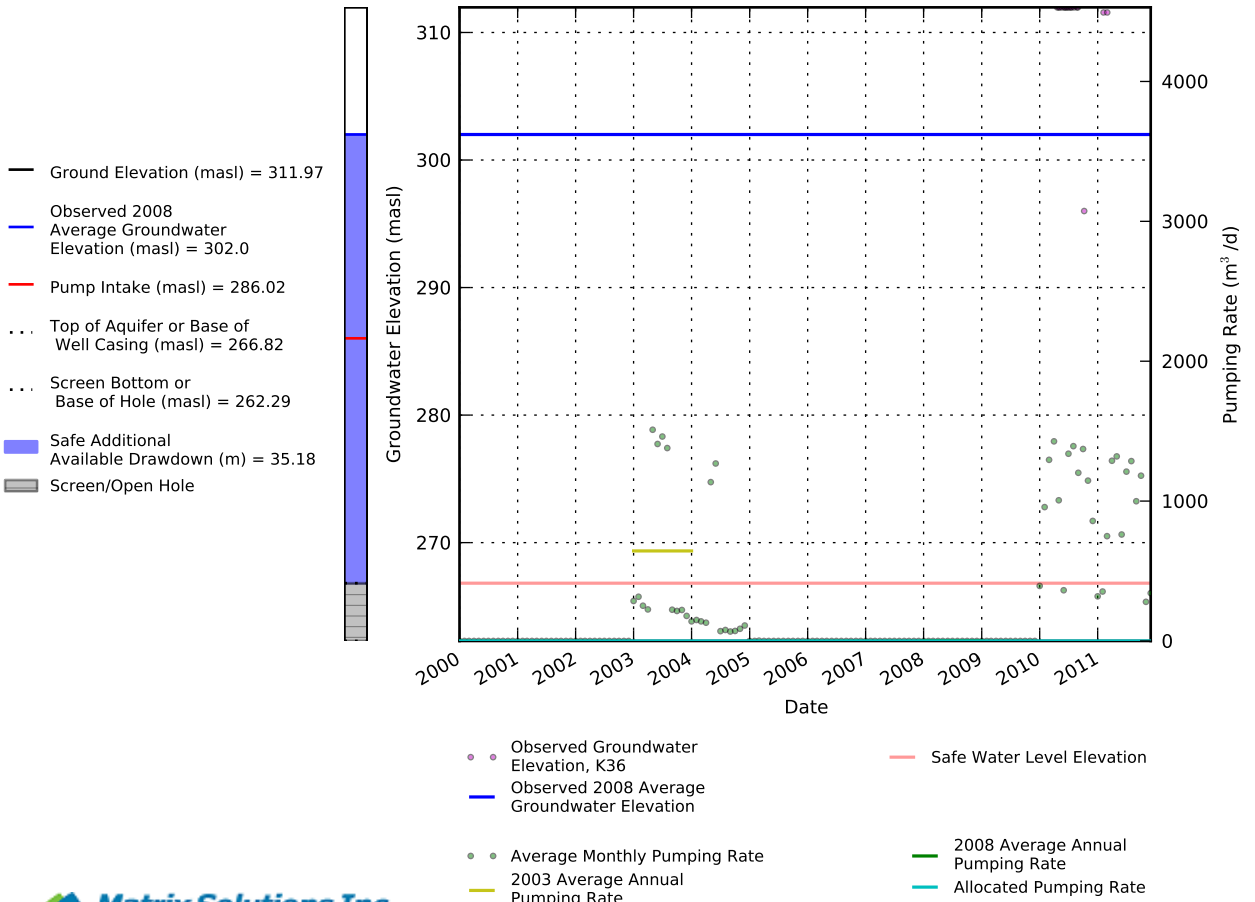

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Figure F60

HYDROGRAPH
City: Kitchener / Well Field: WOOLNER
Consult_ID: K80 / Obj_Num: 6504313

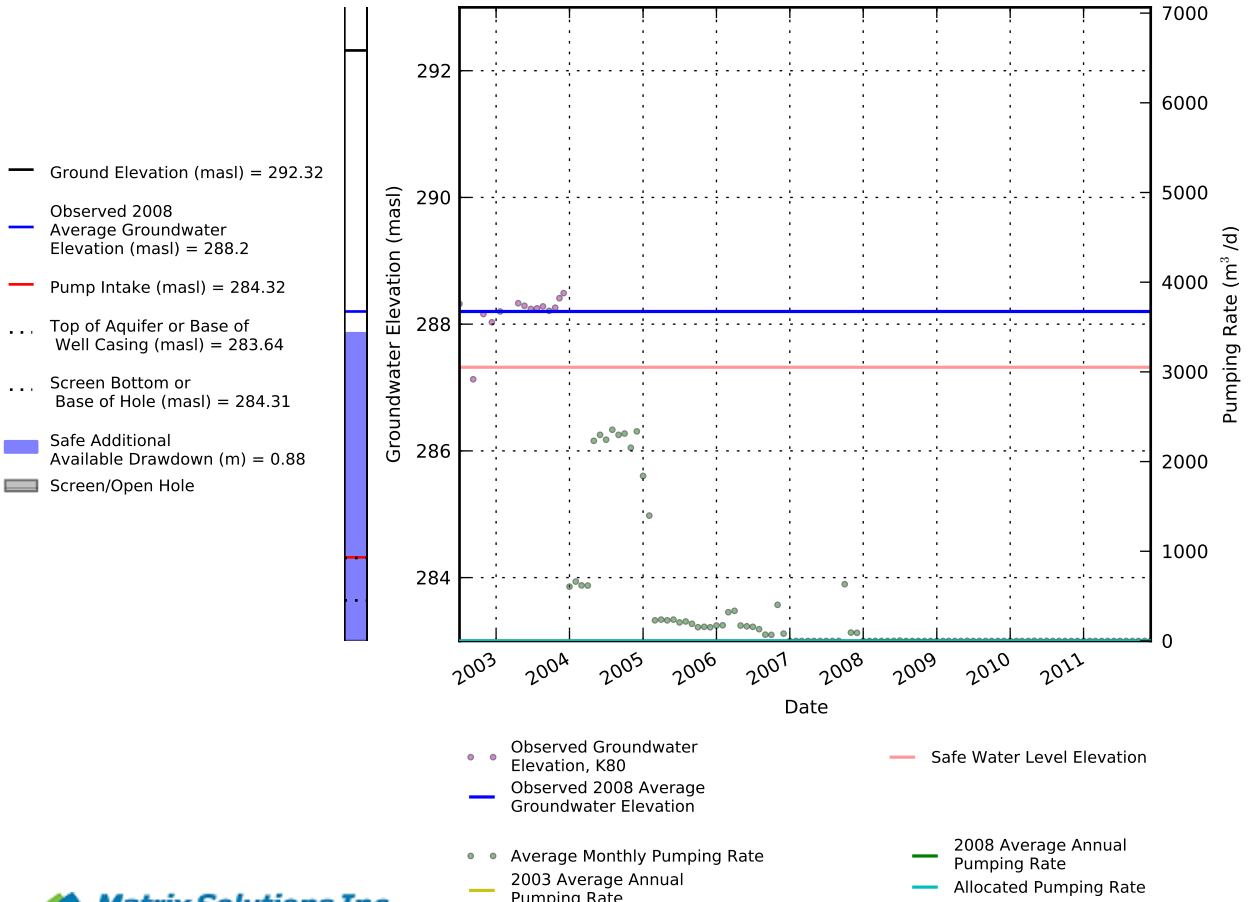

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Figure F61

HYDROGRAPH
City: Kitchener / Well Field: WOOLNER
Consult_ID: K81 / Obj_Num: 6504994

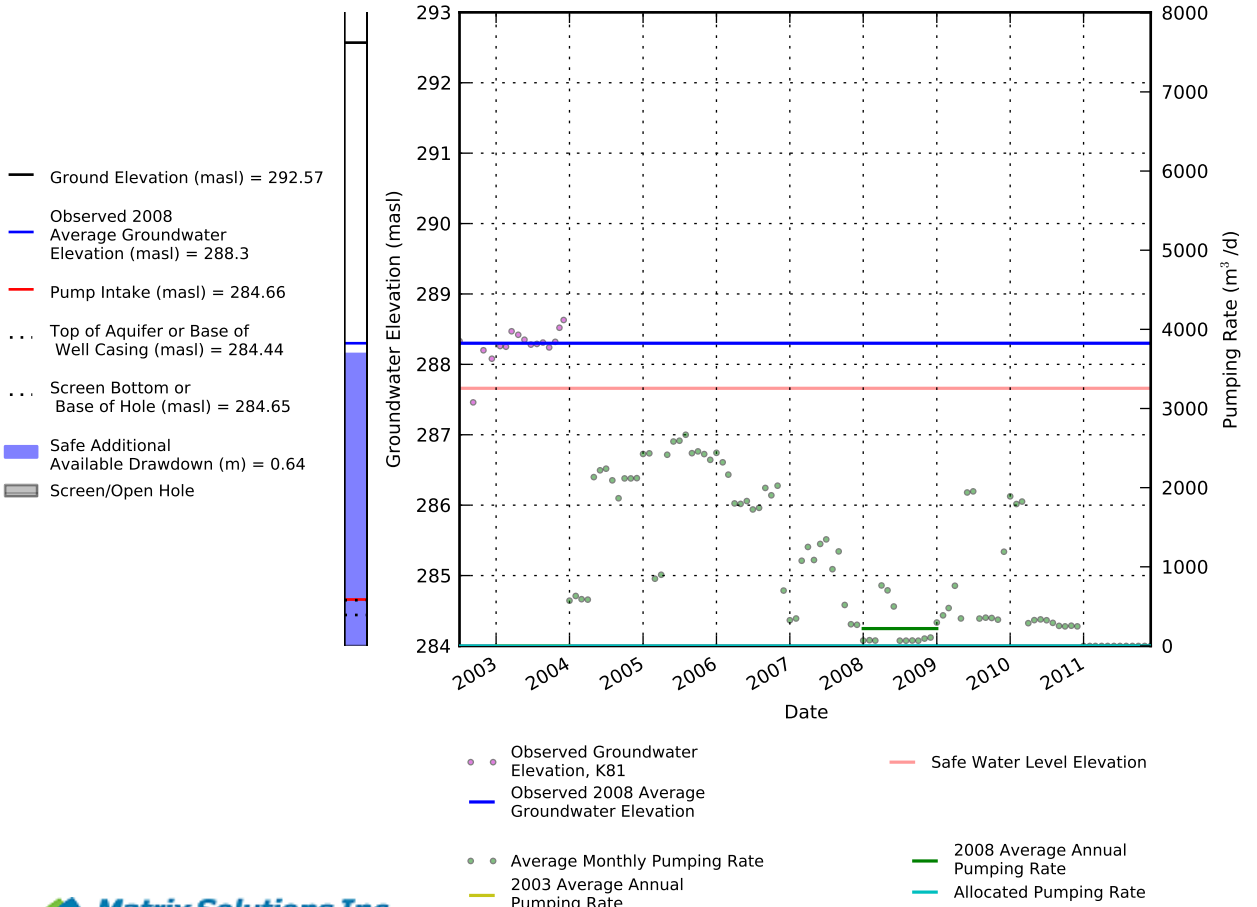

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Figure F62

HYDROGRAPH
City: Kitchener / Well Field: WOOLNER
Consult_ID: K82 / Obj_Num: 6504993

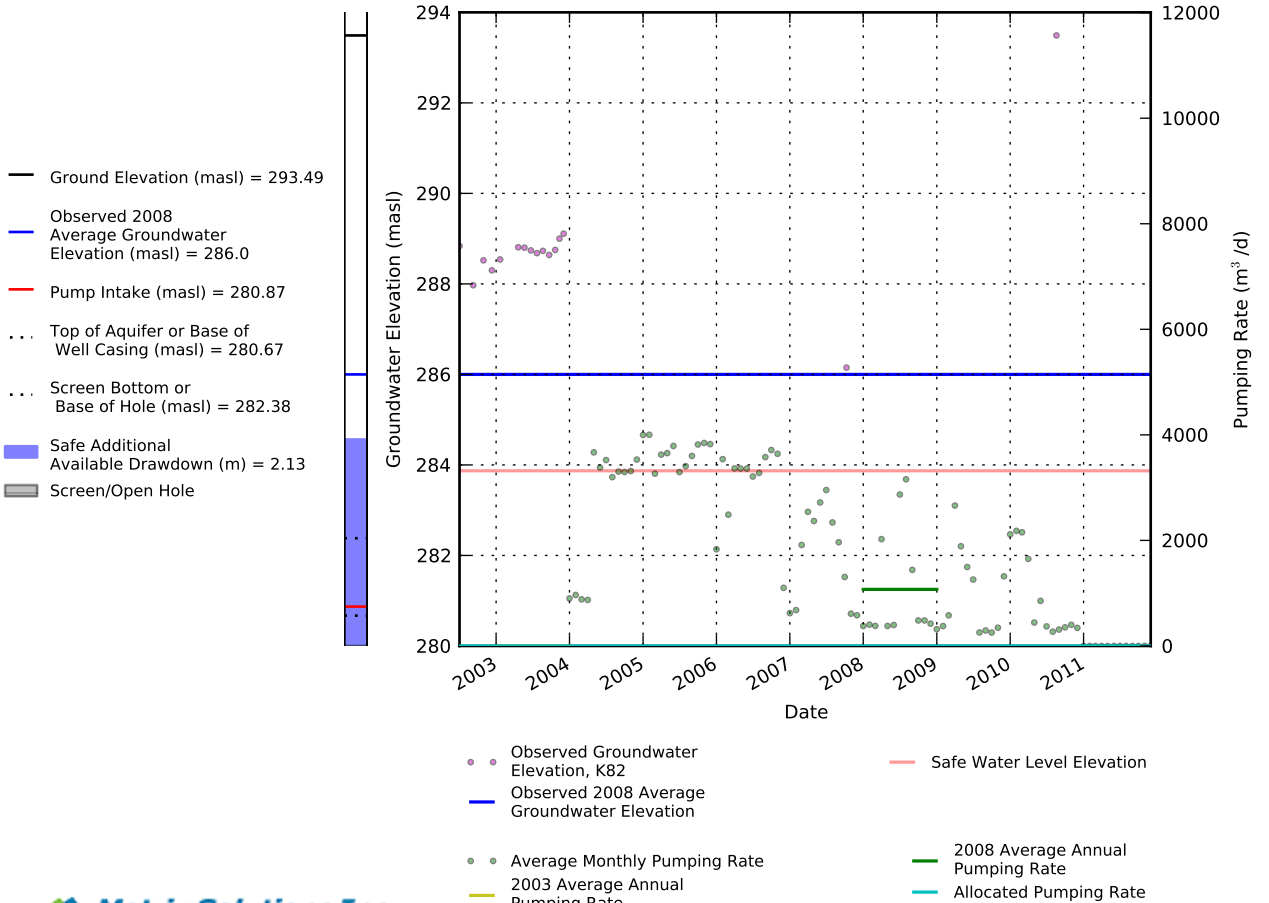

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Figure F63

HYDROGRAPH
City: Waterloo / Well Field: ERB STREET
Consult_ID: W6A / Obj_Num: 6503210

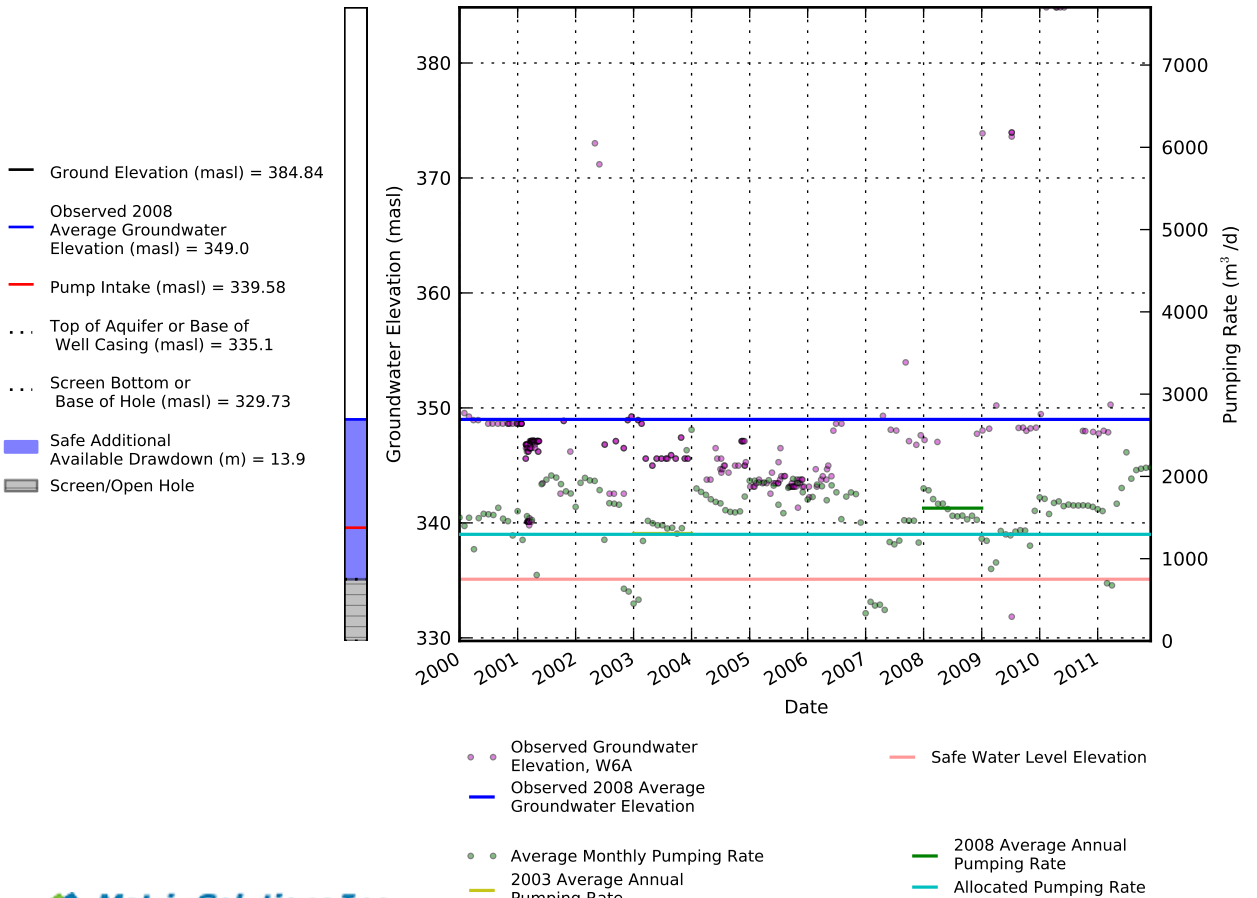

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Figure F64

HYDROGRAPH
City: Waterloo / Well Field: ERB STREET
Consult_ID: W6B / Obj_Num: 6505741

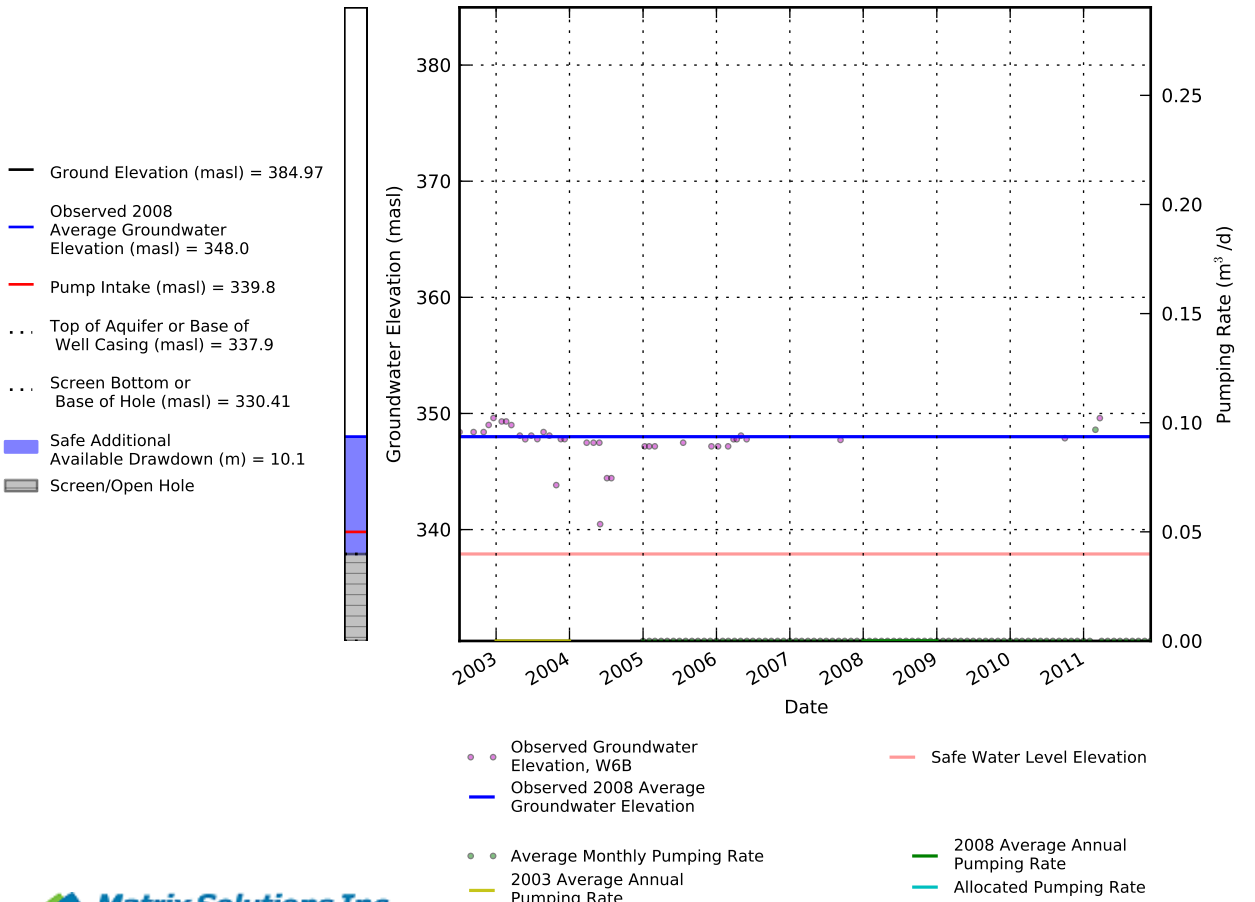

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Figure F65

HYDROGRAPH
City: Waterloo / Well Field: ERB STREET
Consult_ID: W7 / Obj_Num: 6502377

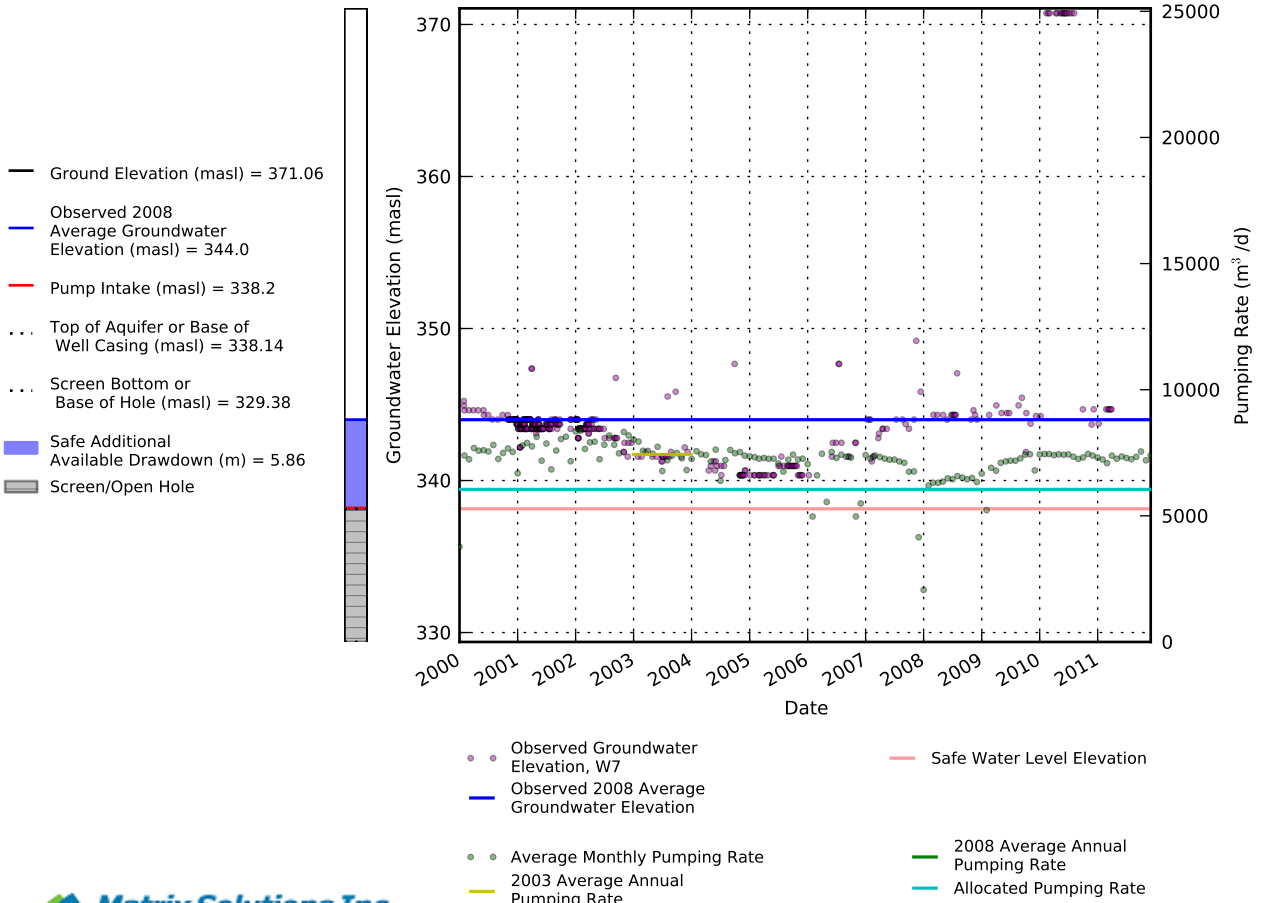

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Figure F66

HYDROGRAPH
City: Waterloo / Well Field: ERB STREET
Consult_ID: W8 / Obj_Num: 6503180

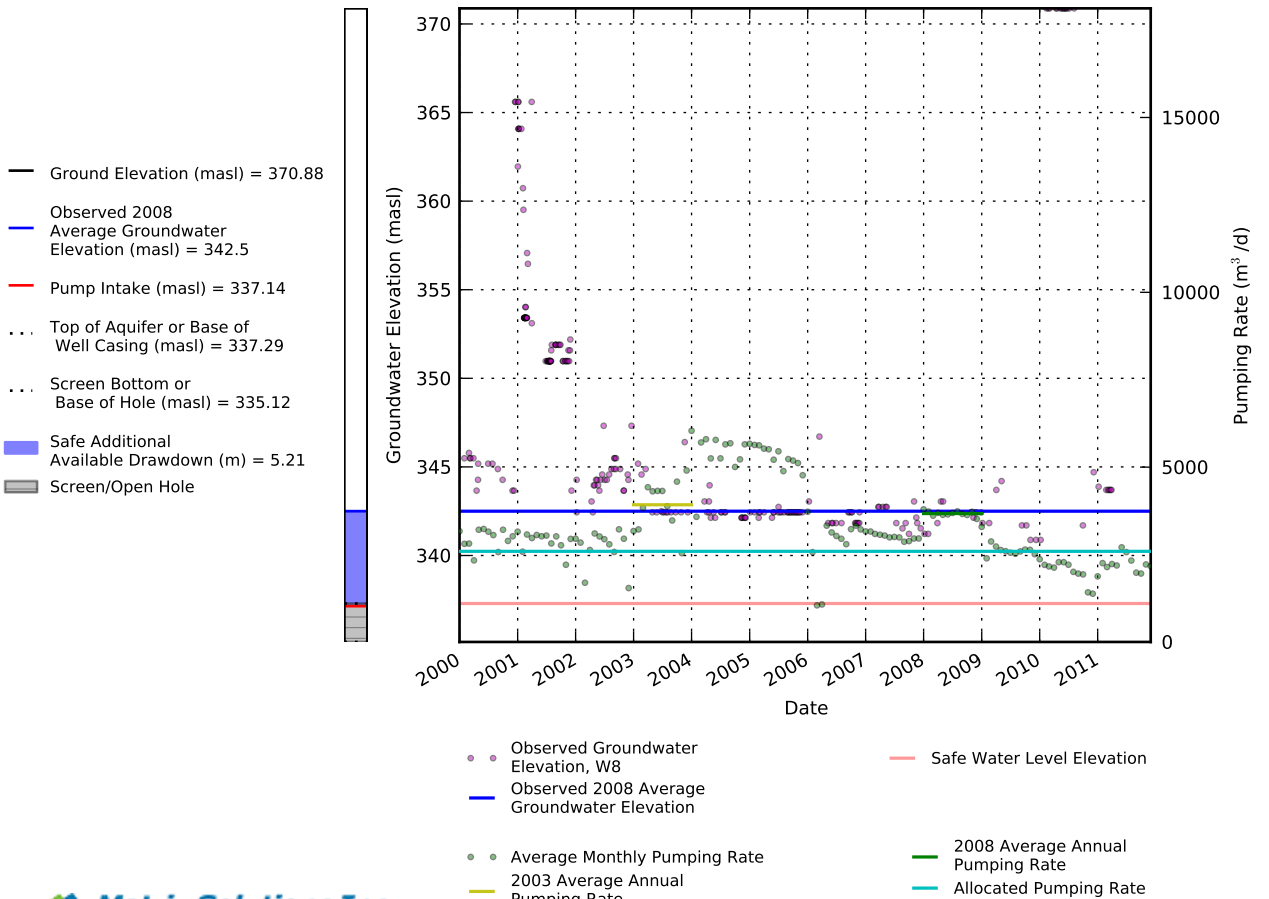

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Figure F67

HYDROGRAPH
City: Waterloo / Well Field: WATERLOO NORTH
Consult_ID: W10 / Obj_Num: 6503645

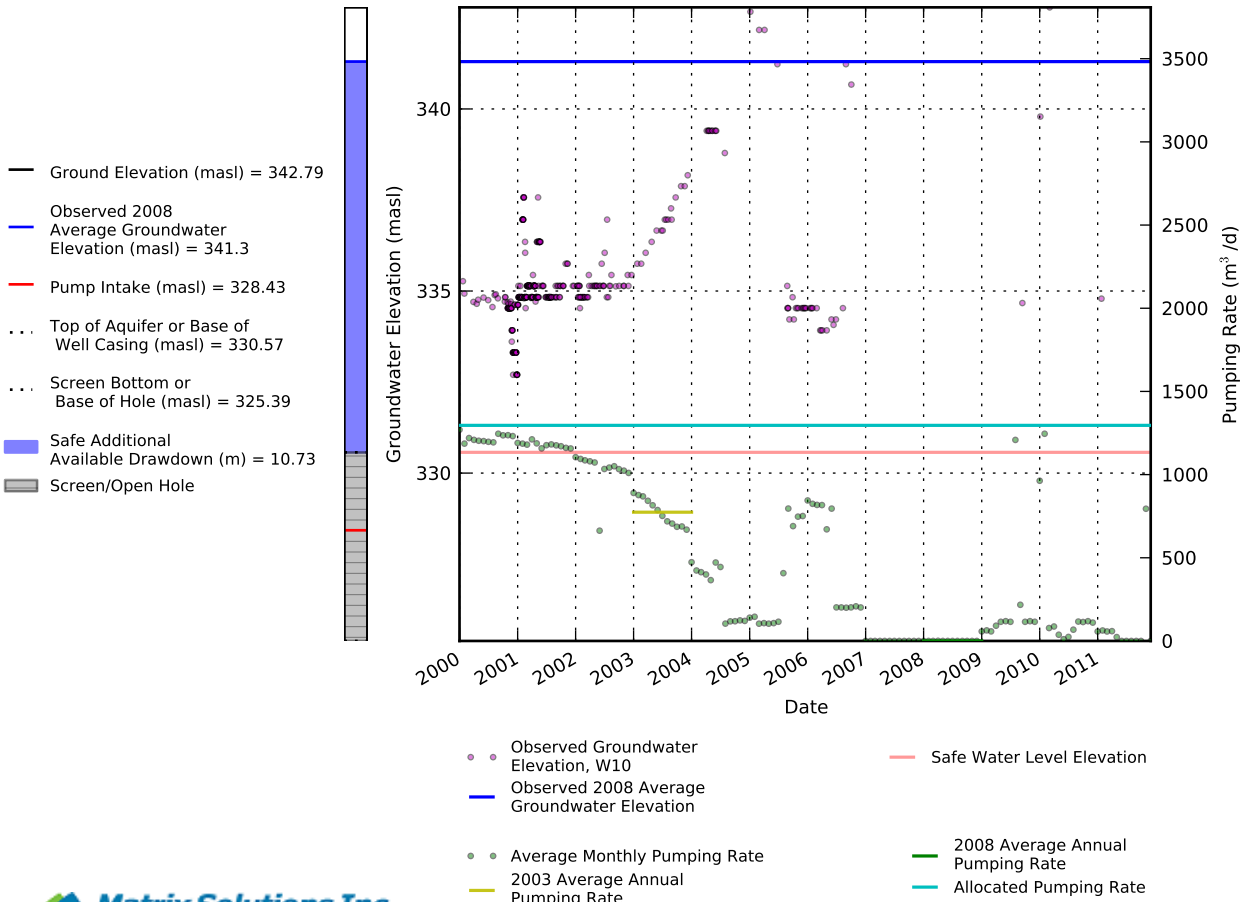

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Figure F68

HYDROGRAPH
City: Waterloo / Well Field: WILLIAM STREET
Consult_ID: W1B / Obj_Num: 6504731

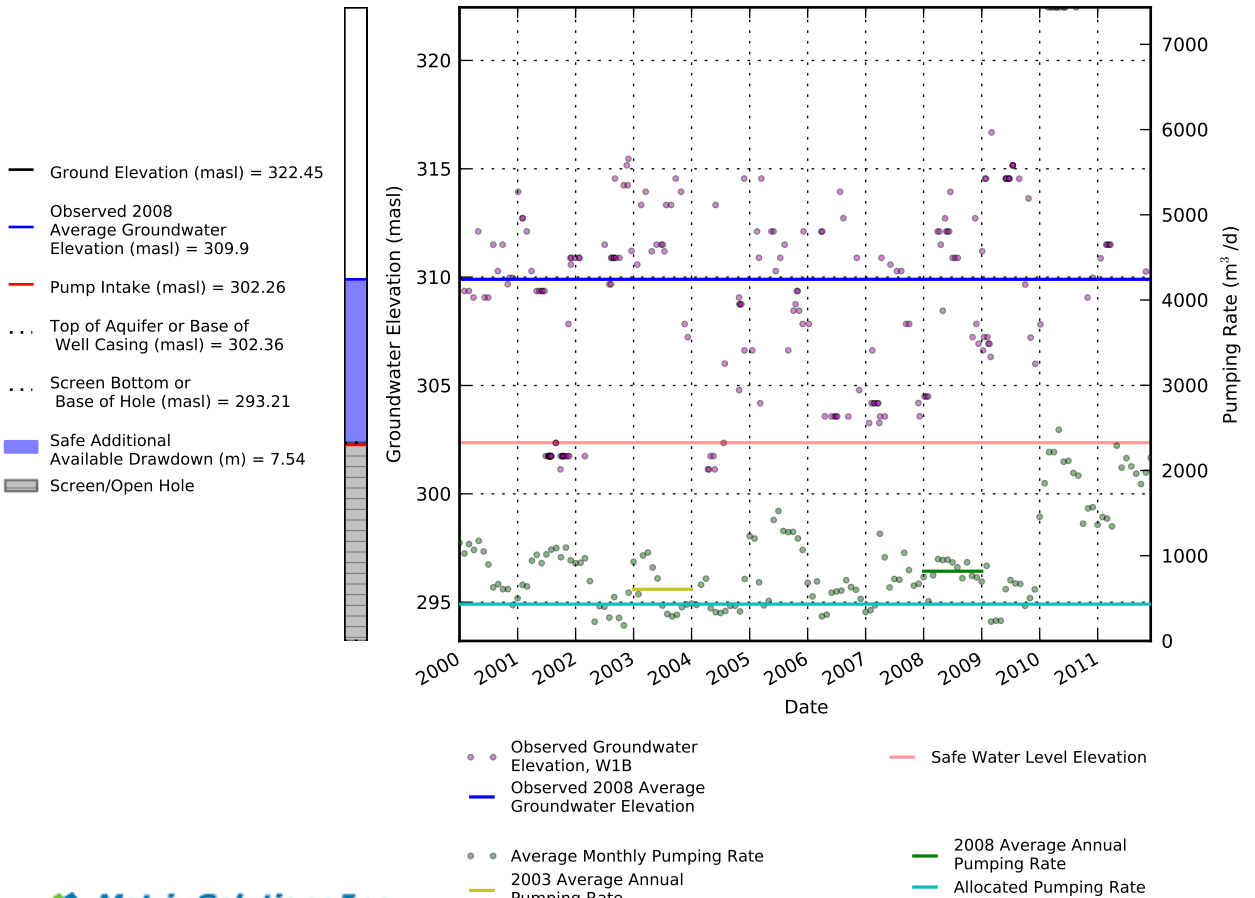

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Figure F69

HYDROGRAPH
City: Waterloo / Well Field: WILLIAM STREET
Consult_ID: W1C / Obj_Num: 6505534

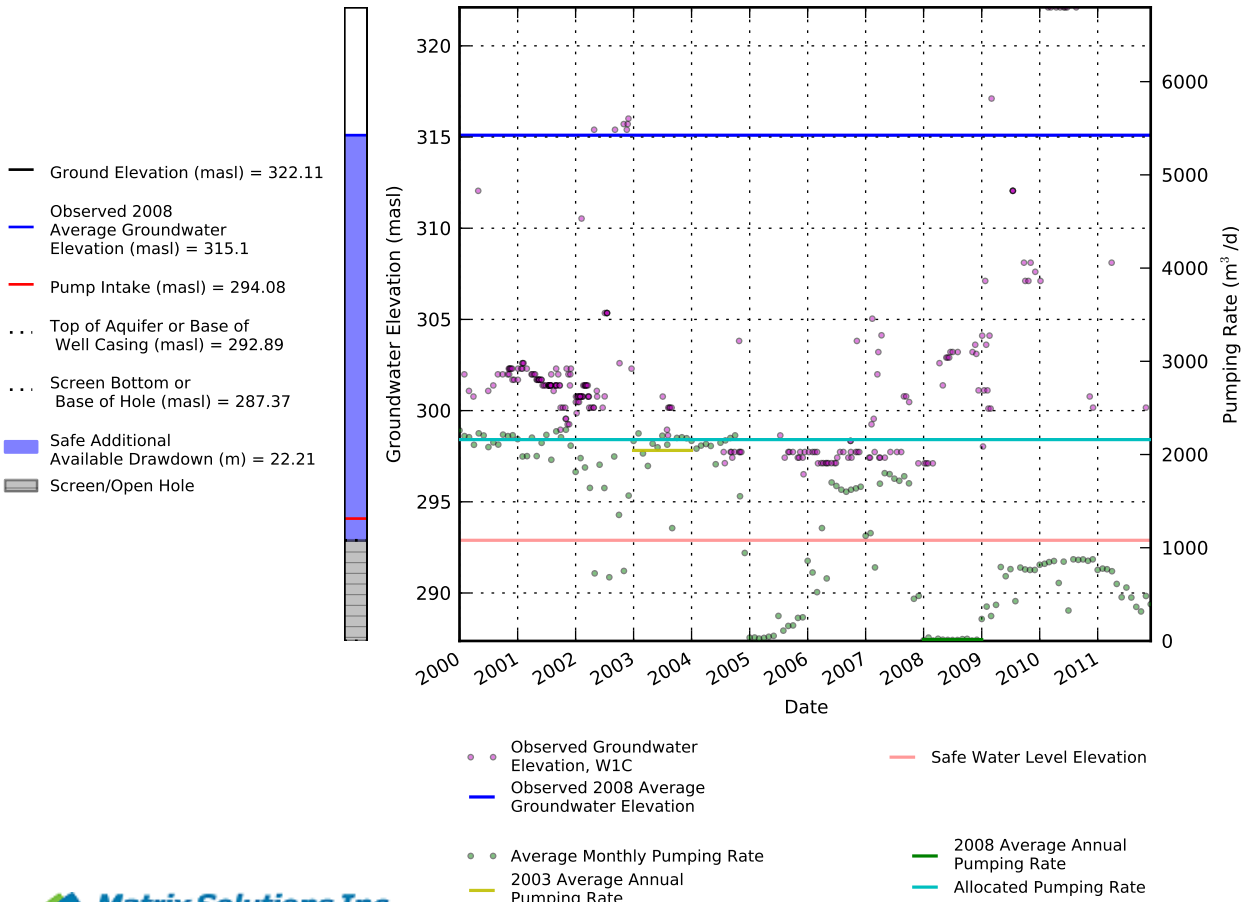

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Figure F70

HYDROGRAPH
City: Waterloo / Well Field: WILLIAM STREET
Consult_ID: W2 / Obj_Num: 6500854

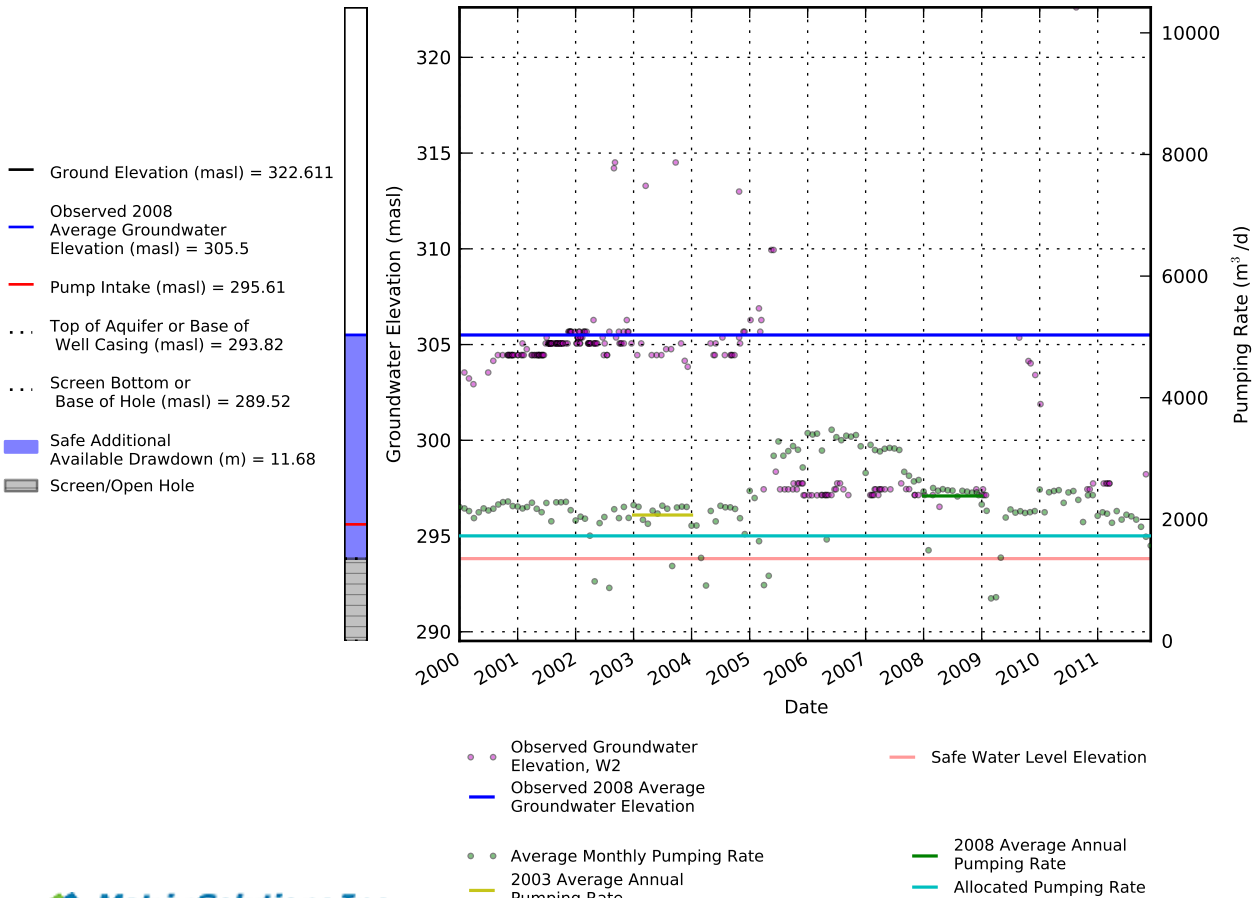

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Figure F71

HYDROGRAPH
City: Waterloo / Well Field: WILLIAM STREET
Consult_ID: W3 / Obj_Num: 6500848

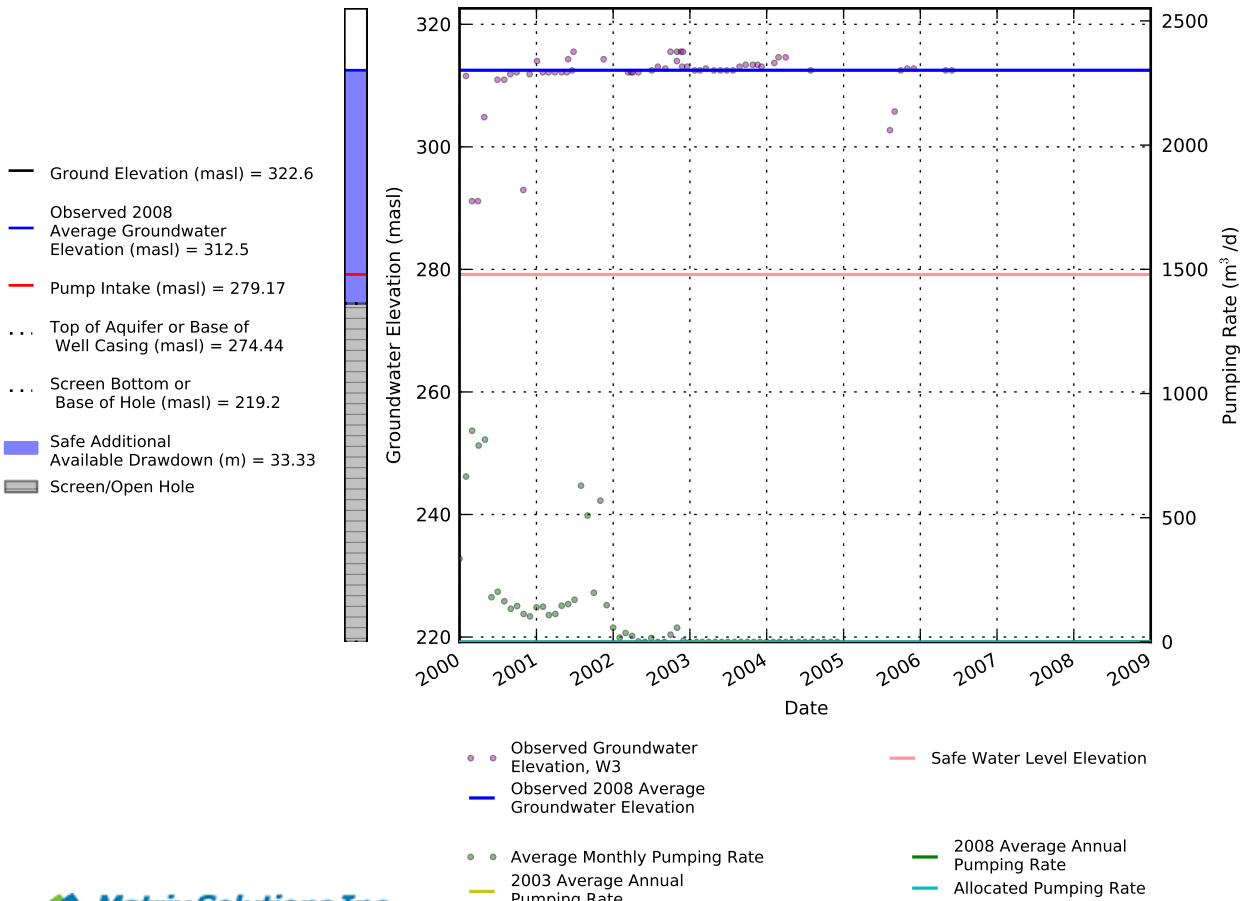

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Figure F72

HYDROGRAPH
City: Rural / Well Field: CONESTOGO (PLAINS)
Consult_ID: C3 / Obj_Num: 1000298

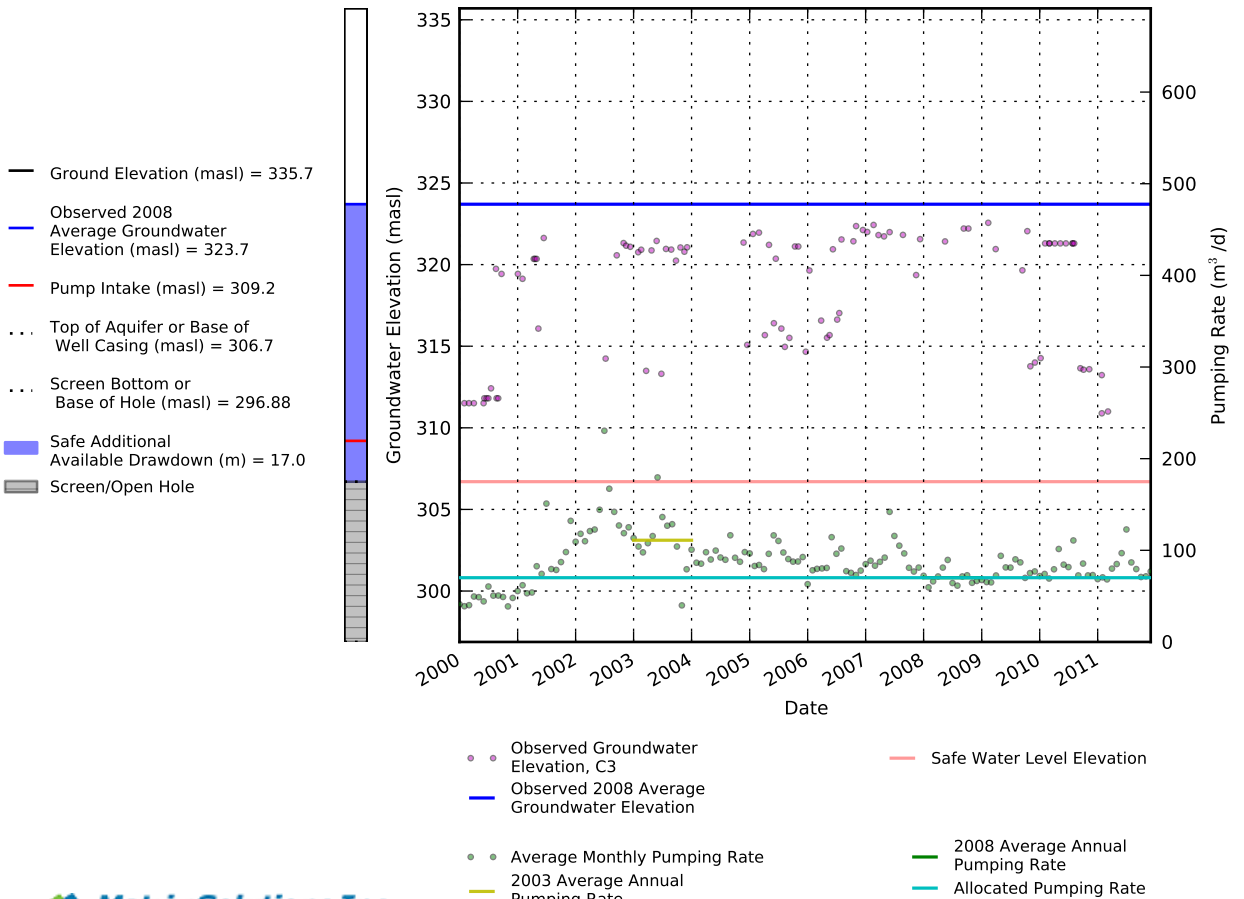

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Figure F73

HYDROGRAPH
City: Rural / Well Field: CONESTOGO (PLAINS)
Consult_ID: C4 / Obj_Num: 6506670

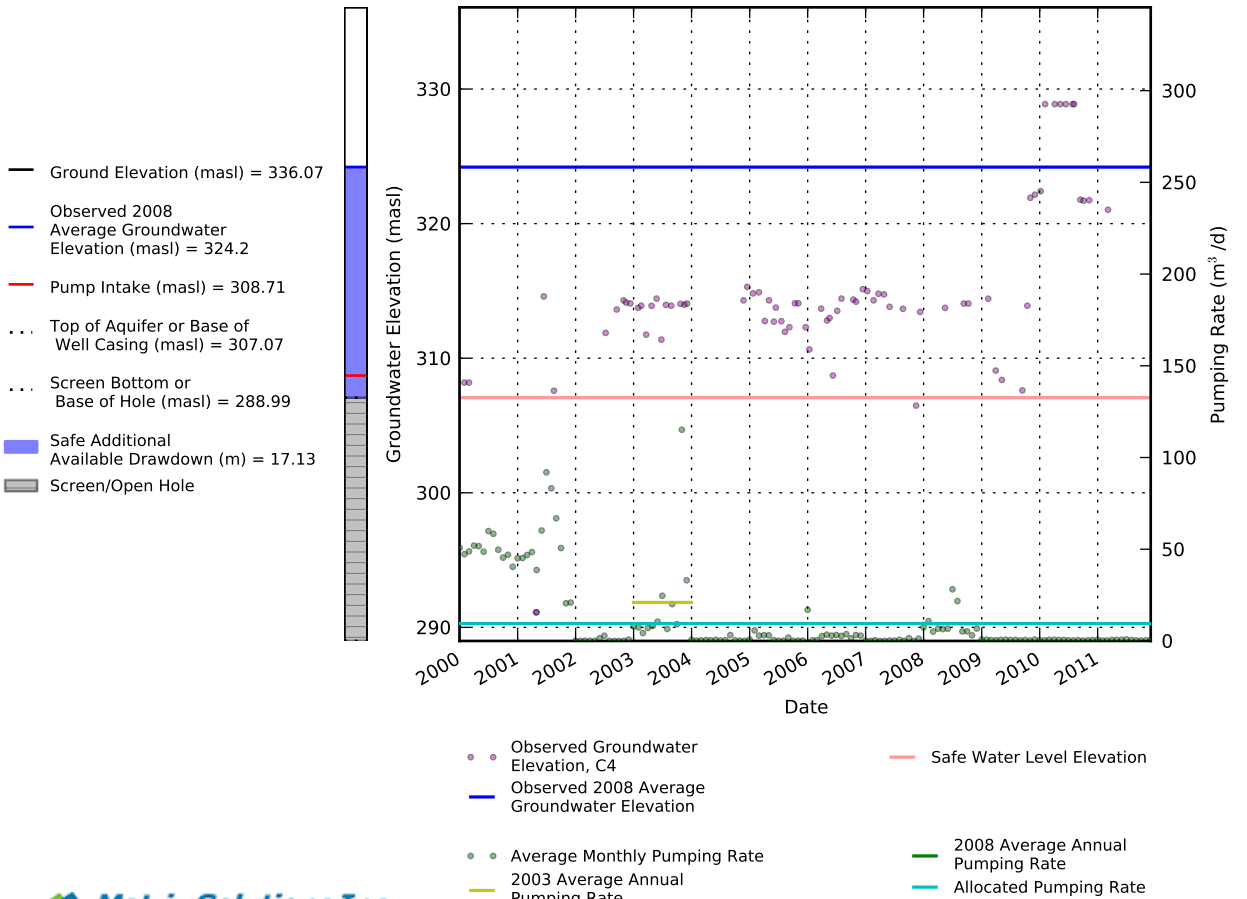

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Figure F74

HYDROGRAPH
City: Rural / Well Field: ELMIRA
Consult_ID: E10 / Obj_Num: 1000297

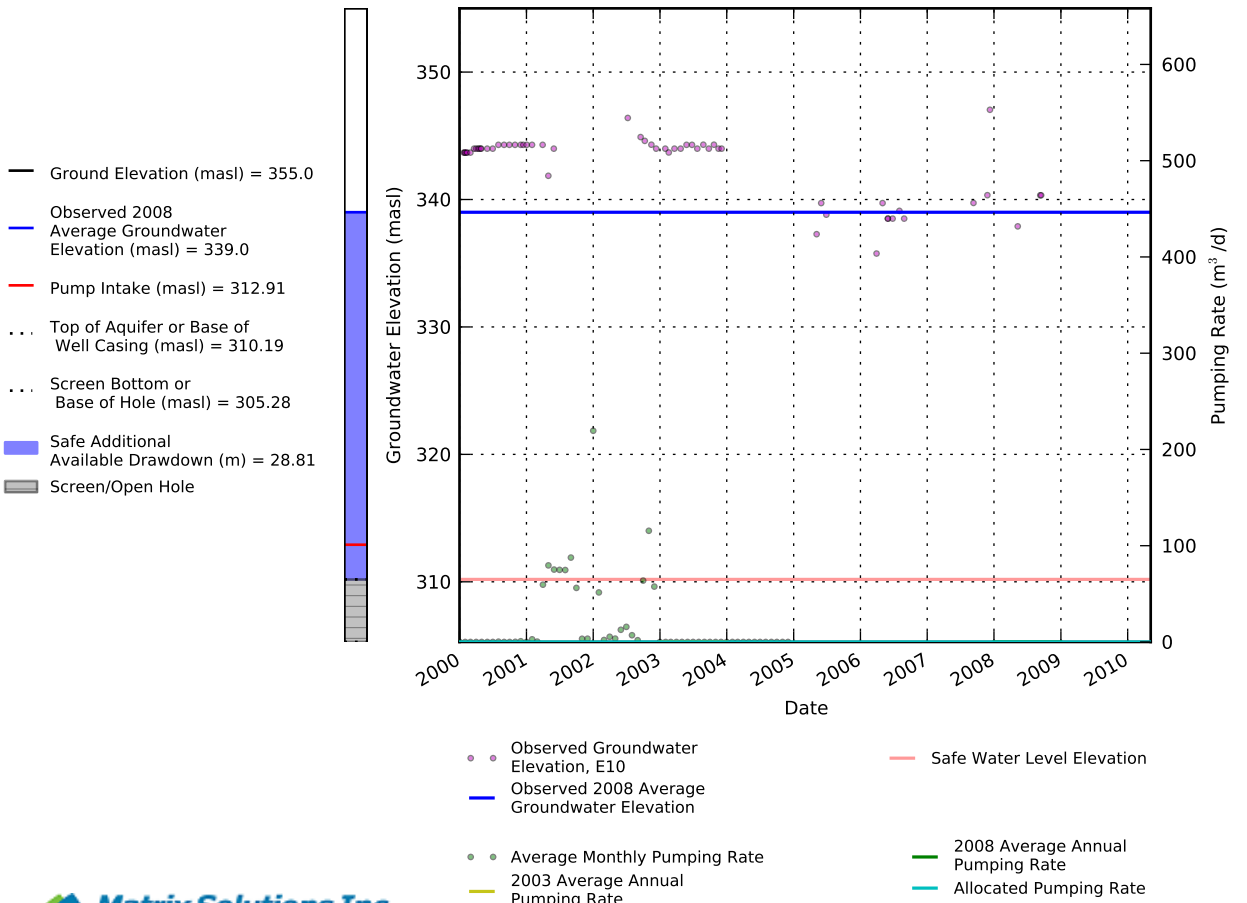

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Figure F75

HYDROGRAPH
City: Rural / Well Field: NEW DUNDEE
Consult_ID: ND4 / Obj_Num: 6506733

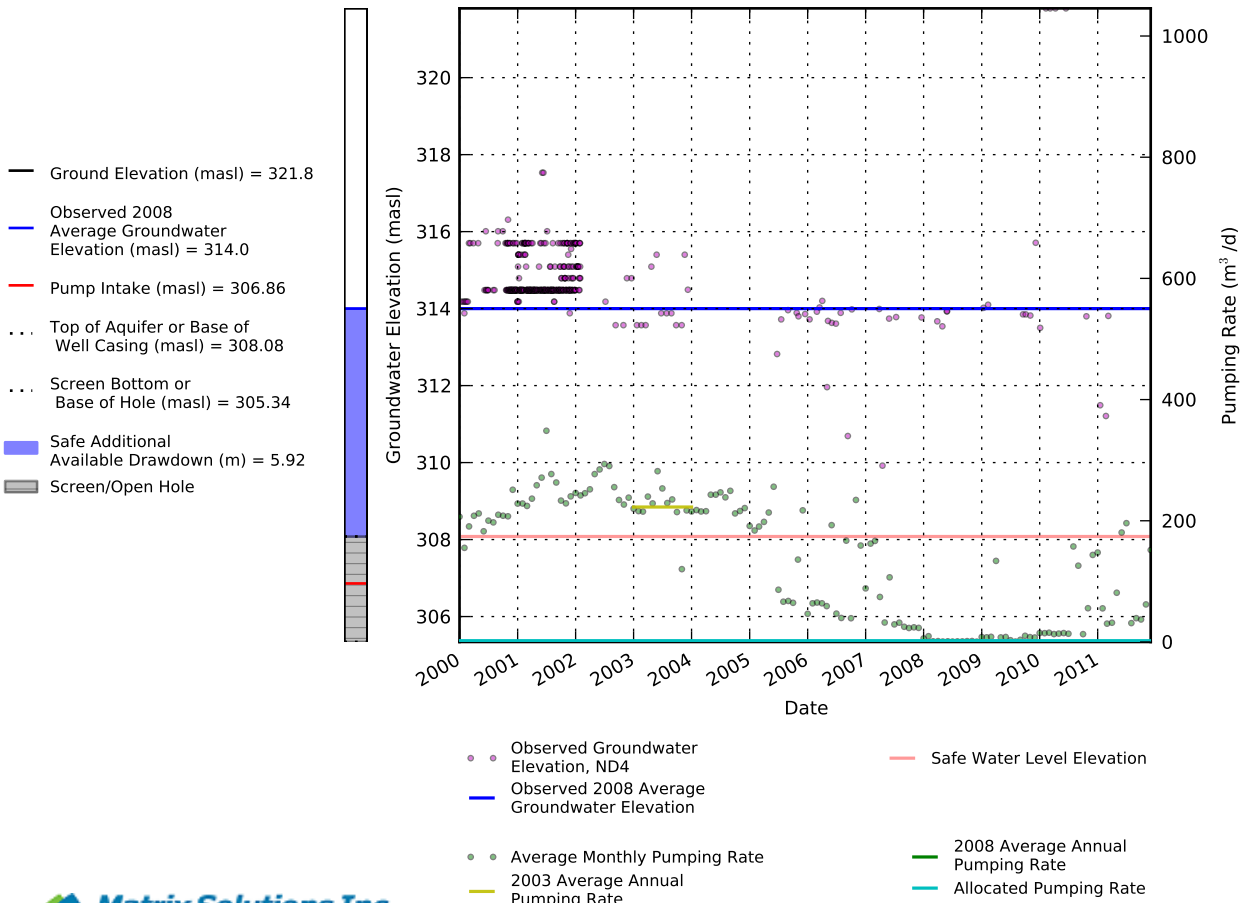

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Figure F76

HYDROGRAPH
City: Rural / Well Field: NEW DUNDEE
Consult_ID: ND5 / Obj_Num: 9201303

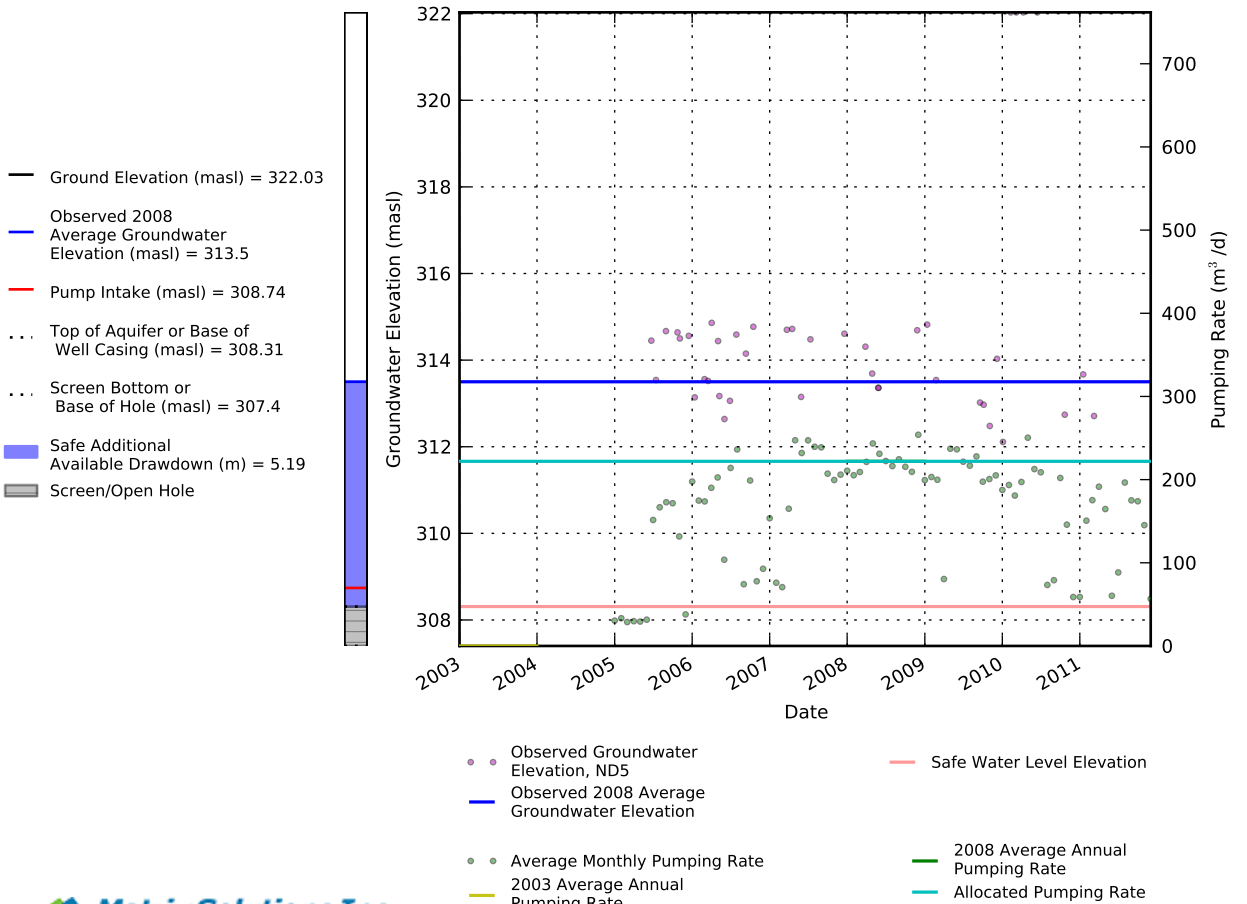

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Figure F77

HYDROGRAPH
City: Rural / Well Field: ST. AGATHA
Consult_ID: SA3 / Obj_Num: 6505872

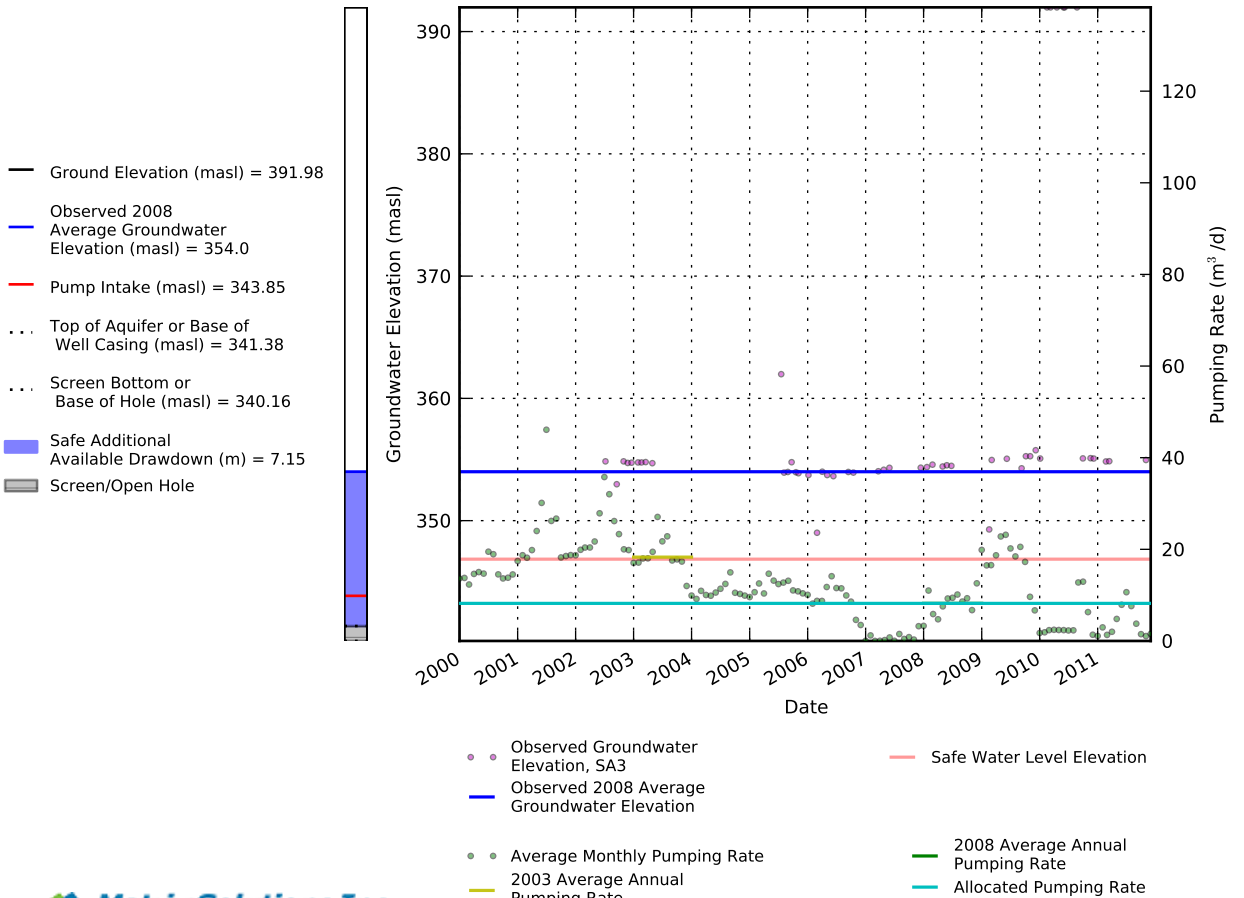

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Figure F78

HYDROGRAPH
City: Rural / Well Field: ST. AGATHA
Consult_ID: SA4 / Obj_Num: 6506274

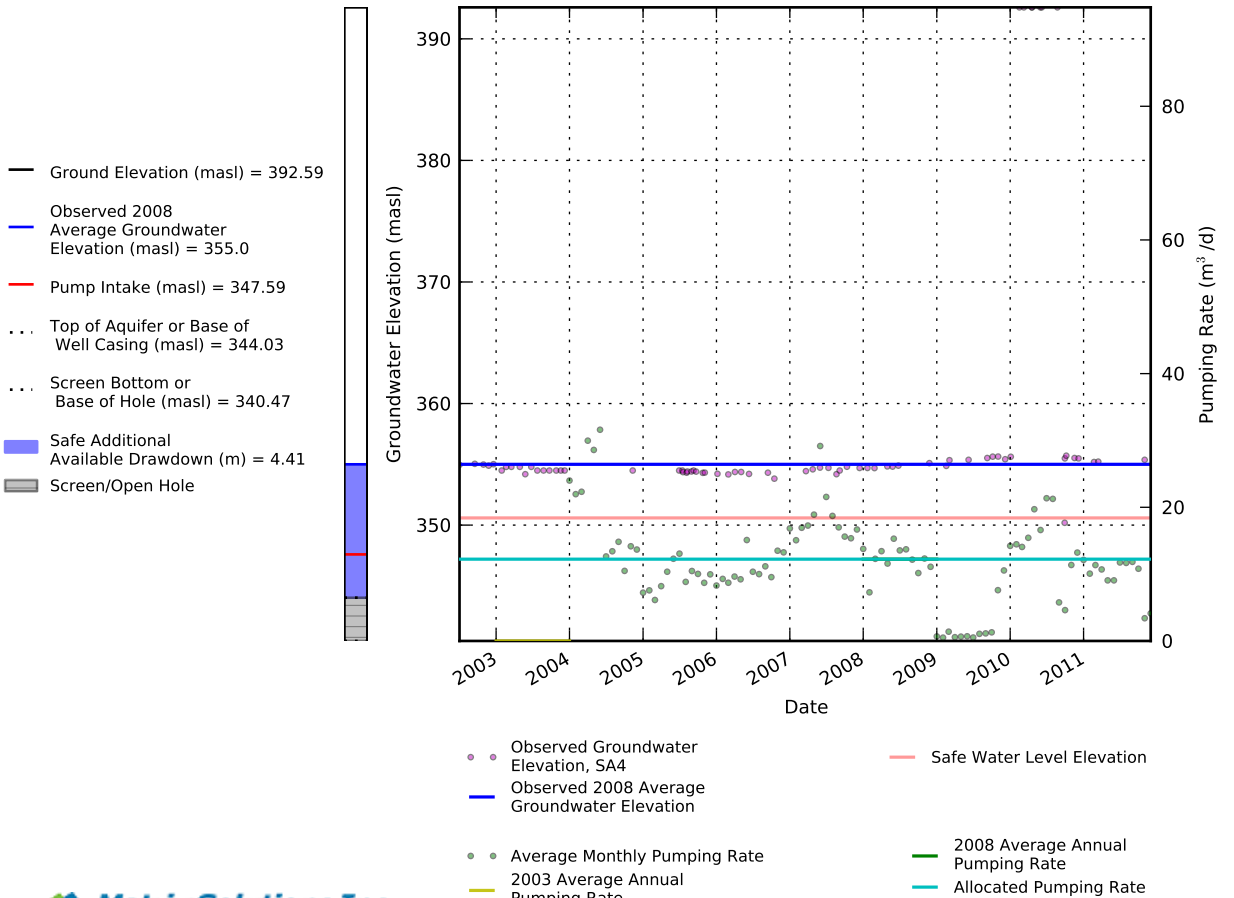

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Figure F79

HYDROGRAPH
City: Rural / Well Field: ST. AGATHA
Consult_ID: SA5 / Obj_Num: 6502359

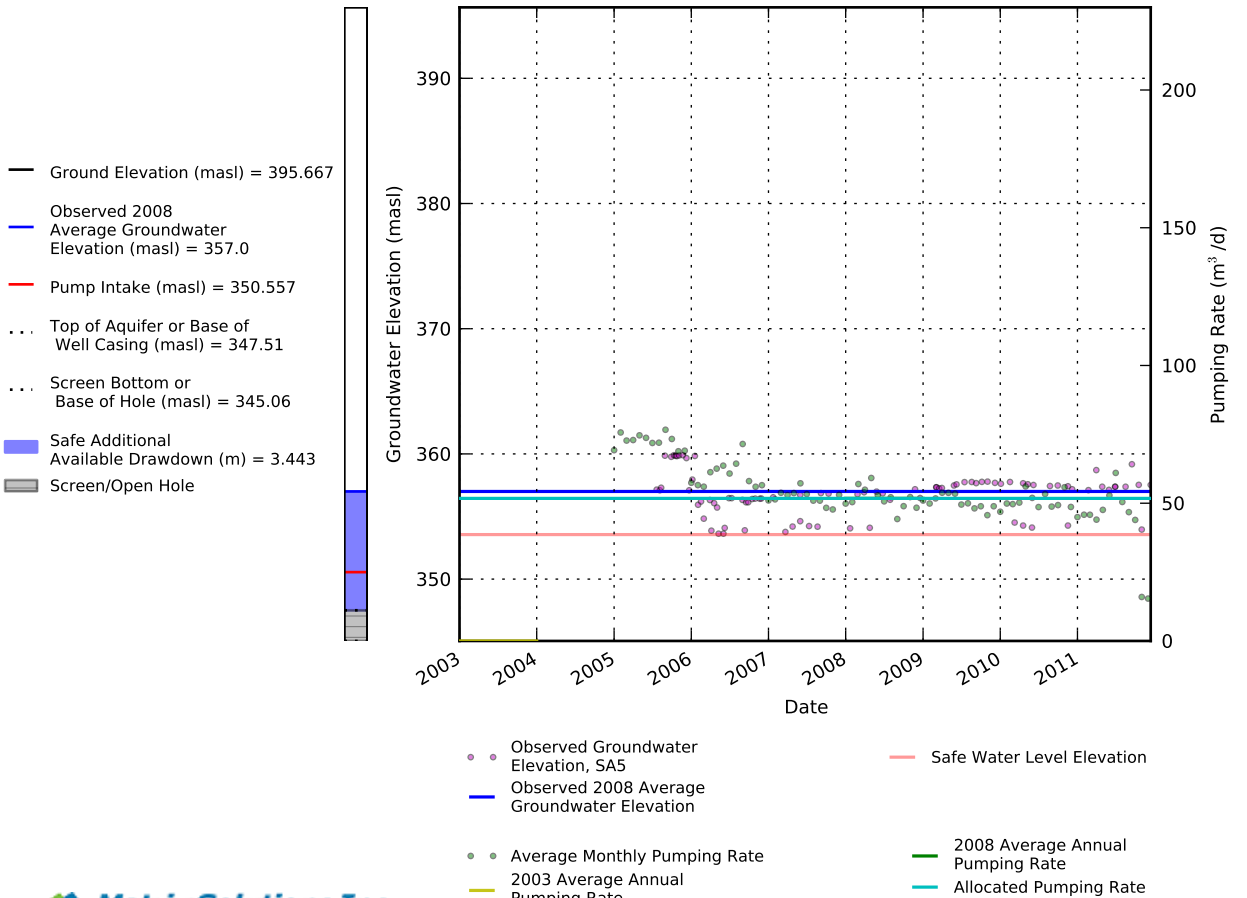

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Figure F80

HYDROGRAPH
City: Rural / Well Field: ST. AGATHA
Consult_ID: SA6 / Obj_Num: 6505740

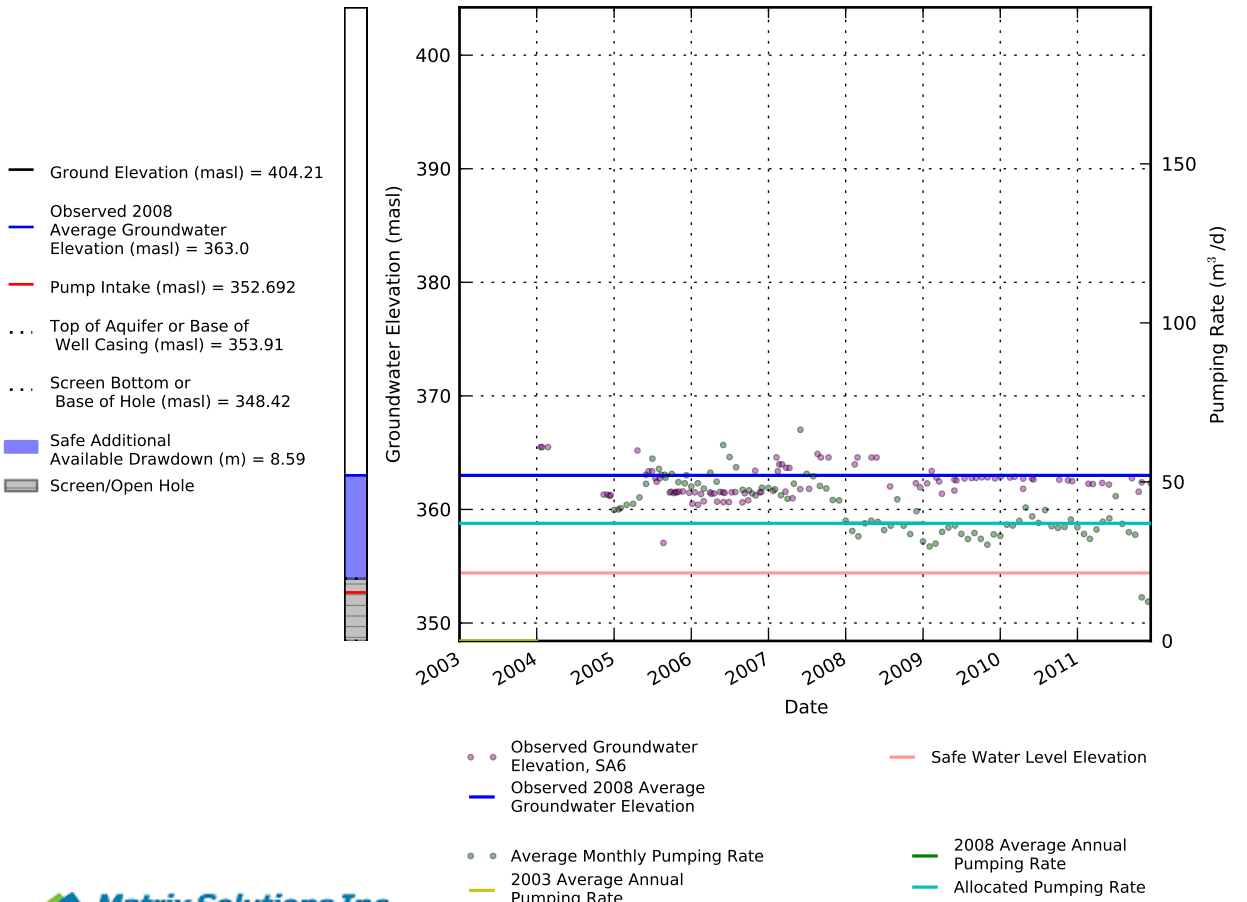

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Figure F81

HYDROGRAPH
City: Rural / Well Field: WEST MONTROSE
Consult_ID: WM1 / Obj_Num: 9200037

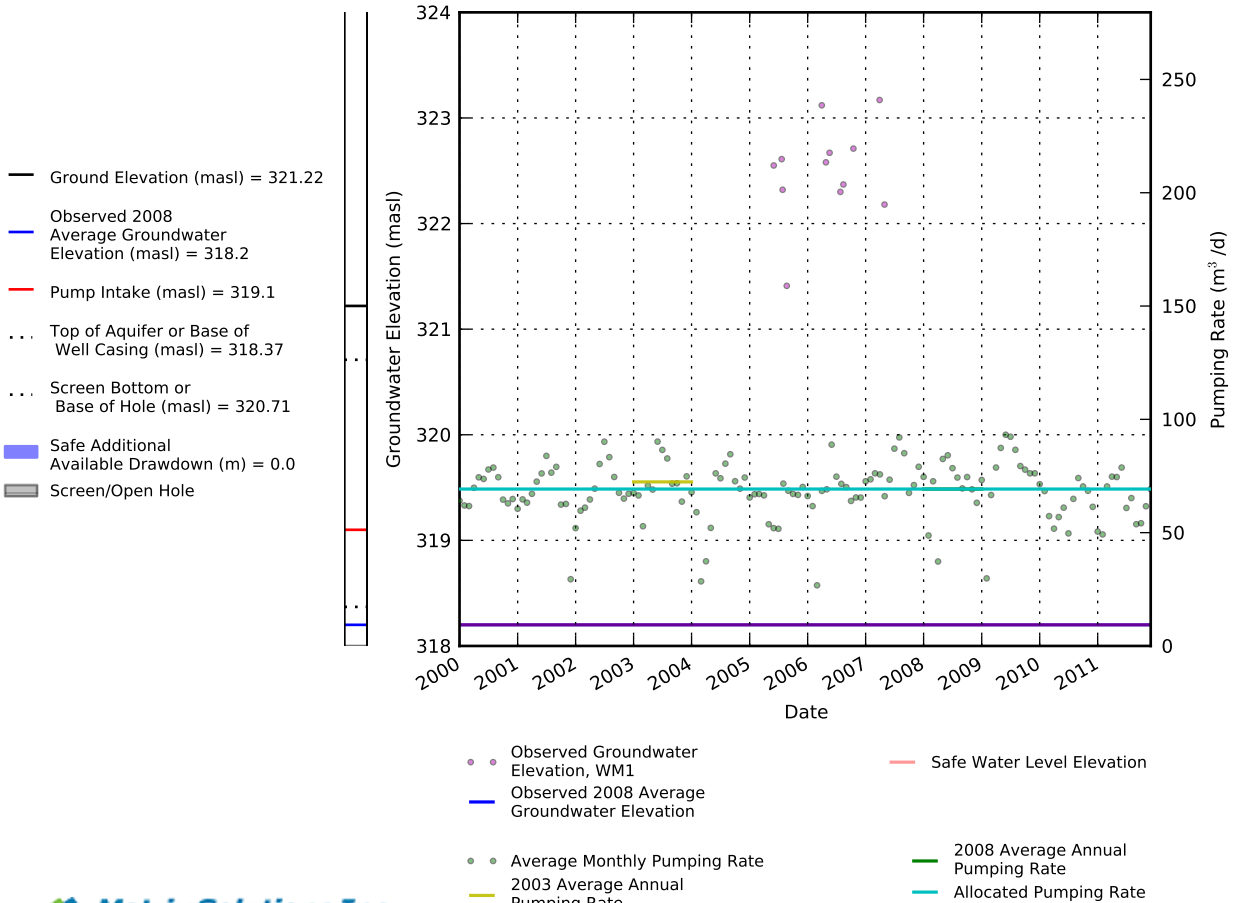

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Figure F82