TRC

Customer-Focused Solutions

August 28, 2002

California Regional Water Quality Control Board (CRWQCB)
San Diego Region
9771 Clairemont Mesa Boulevard, Suite B
San Diego, California 92126

ATTN: MS. KELLY DORSEY

SITE: 76 STATION 6519
28903 RANCHO CALIFORNIA ROAD
TEMECULA, CALIFORNIA
CAO R9-2002-0105

RE: SITE CONCEPTUAL MODEL

Dear Ms. Dorsey:

This Site Conceptual Model (SCM) has been prepared by TRC Alton Geoscience, Inc. (TRC) on behalf of Tosco Corporation (Tosco) and in accordance with the June 5, 2002 Cleanup and Abatement Order (CAO) No. R9-2002-0105. As described in the CAO, the SCM is:

> "a written or pictorial representation of the release scenario and the likely distribution of wastes at the site. The SCM shall identify and describe the types of wastes present including their distribution in space and time, and how the wastes are changing in space and time.
>
> The SCM shall also identify the potential, current and future receptors in the area; link potential sources to potential receptors through transport of wastes in the air, soil and water; and identify the fate and transport characteristics of the site. It should describe or show the physical characteristics and properties of the subsurface and identify the environmental issues that need to be investigated (and those issues that do not need to be addressed). The initial SCM shall include a discussion of the level of uncertainty of conclusions, outline data gaps remaining in the conceptual model, and describe the additional work needed to complete the SCM."

RELEASE SCENARIO AT 76 STATION

The exact location and time of the gasoline release(s) from the 76 station can not be determined from available data. However, general conclusions regarding the source of

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hydrocarbons at the site can be made. Based on available data, it appears that a release of gasoline range hydrocarbons from the USTs and/or piping occurred in the 1980s. This release was stopped either by ongoing maintenance at the station or by replacement of the USTs in 1989 and piping in 1996.

A significant rise in dissolved-phase hydrocarbons, and particularly MTBE, was observed in well MW-16, located near the USTs, beginning between September and October 1997. Dissolved-phase concentrations in well MW-16 reached a peak of 523,000 ug/l MTBE in February 1999 before dropping to 22,000 ug/l in September 2000, which is similar in magnitude to the most recent MTBE concentration in this well.

The cause of this rise remains unclear, although one possible explanation is that disturbance of the soil during station renovation activities in 1996 facilitated the migration of hydrocarbons from soil to groundwater. Repeated inspections of the UST system have not located a leak in the existing UST system. Tosco stopped using MTBE at this station in December 2000 (replaced by ethanol), and began using a soil a vapor extraction system (VES) in July 2001 with limited affect on dissolved-phase concentrations in well MW-16. It is not clear what affect the recent groundwater pumping remediation system has had on dissolved-phase concentrations because of the short time of operation.

DISTRIBUTION OF HYDROCARBONS

The primary contaminants of concern at this site are petroleum hydrocarbons typically associated with a gasoline release, including benzene, toluene, ethylbenzene, xylenes, methyl tertiary butyl ether (MTBE), and tertiary butyl alcohol (TBA).

On the 76 station site, the petroleum hydrocarbons appear limited in distribution to the shallow soil and groundwater. Impacts to soil are primarily located below previous source areas, i.e. in the vicinity of the USTs and dispensers. Impacts to groundwater on the station are highest in well MW-16, which is located near and directly downgradient of the USTs. Dissolved-phase hydrocarbons appear to have migrated laterally with the groundwater gradient to the north side of the station and Rancho California Road. What appears to be a laterally continuous geologic layer of low permeability silt has been identified below the shallow groundwater table on- and off-site. The silt appears to be acting as an aquitard limiting the vertical migration of the hydrocarbons downward.

This pattern of hydrocarbon distribution has been consistently identified during site investigations and groundwater sampling events. However, there have been some anomalous data involving the groundwater gradient, including:

- During the first three 76 station monitoring events in 1992 and 1993, the groundwater flow direction appeared to be to the south or southeast. However, since the installation of additional monitoring wells in February 1993, the flow direction has consistently been to the northwest. It is not clear whether there was an actual change

in flow direction or, as appears more likely, more complete data facilitated a more comprehensive interpretation of the flow direction.

- Well MW-18 and former well MW-9 have generally had groundwater elevations a few feet lower than the rest of the 76 station. The cause of this is not clear.

- A mounding of groundwater, i.e. higher groundwater elevations, has consistently been observed in well B-13 relative to other nearby wells. The cause of this mounding is unclear, but may be the result of irrigation in the nearby planter or leaks from a nearby Rancho California Water District water line. The water line is located within two feet of well B-13.

A more comprehensive discussion of the site geology, hydrogeology, contaminants of concern, groundwater gradient, and distribution of petroleum hydrocarbons is provided in the Site Assessment report dated August 28, 2002.

RECEPTORS

Potential receptors in the vicinity of the site include Murrietta Creek, drinking water wells, and occupants of buildings located over impacted soil or groundwater.

The flood channel embankment of Murrietta Creek begins approximately 100 feet southwest of the site, across Front Street. The primary stream channel is approximately 250 feet southwest of the site. The flow of the creek is seasonal, varying with rainfall and aquifer recharge.

The closest drinking water well is Rancho California Water District (RCWD) well 118, which is approximately 1,000 feet northwest of the site. Water from this well is blended with water from other wells to provide drinking water to approximately 23,000 connections to their system. The next closest RCWD wells are almost 1/2 mile northwest and over 3/4 mile northeast of the site.

A smaller production drinking water well was identified at the Kids World School, approximately 1/2 mile south-southeast and upgradient of the site.

The only building located over or near impacted soil or groundwater associated with the release from the 76 station is the station building onsite and possibly the Denny's restaurant next door.

A more comprehensive description of the identification of nearby wells and other potential receptors is provided in the Site Assessment report dated August 28, 2002.

POTENTIAL FOR 76 STATION RELEASE TO AFFECT RECEPTORS

Murrietta Creek

Based on the available data, there is no indication that impacted groundwater is impacting Murrietta Creek. Shallow wells on the west side of Front Street across from the 76 station have consistently shown low concentrations of dissolved-phase hydrocarbons, generally below the detection limits. Previous creek water sampling and soil sampling from hand auger borings in the creek and drilling on the embankment have also shown concentrations below the laboratory detection limits.

RCWD Well 118

It is not clear whether petroleum hydrocarbons released at the 76 station have contributed to detections of MTBE in RCWD well 118. As reported to Tosco by the RCWQCB, the RCWD has reportedly determined that the regional groundwater flow direction is to the south. Using RCWD data, RWQCB staff performed a preliminary evaluation of the capture zone of RCWD well 118, which appears to indicate that the Chevron and 76 stations are on the edge or outside of the capture zone. Also, several other sources of MTBE exist in the area, including some that are upgradient of RCWD well 118.

In addition, a silt aquitard ranging from 15 to 35 feet thick appears to be protecting the deeper groundwater aquifer pumped by well 118 from the shallow petroleum hydrocarbons at the 76 station. This silt layer has consistently been observed at the 76 station as well as in offsite drilling. Although occasional sand lenses were observed within the silt layer, the thickness, continuity, and low permeability of the silt appear adequately defined by TRC's recent offsite drilling. No evidence of a break in the silt layer, i.e. a natural vertical conduit through the silt layer, was identified during this investigation, nor did any boring of adequate depth fail to encounter the silt aquitard.

The only known man-made, vertical conduits through this silt layer are four former Chevron wells screened across the silt layer and possibly into the lower aquifer, i.e. wells R-1, GT-1, GT-2 and GT-3. The available data does not clearly identify whether these wells extended all the way through the silt aquitard into the deeper aquifer. The boring log for R-1, for example, ends in a silty sand that appears likely to represent the same soil demonstrated by recent drilling to be a silt aquitard. Since the silt aquitard identified by TRC has occasional sand lenses and drilling was not performed deeper than the bottom of the wells during their installation by Chevron consultants, it is not possible to determine whether any sand identified at the bottom of these borings represent the deeper aquifer or a sand lens within the aquitard without additional subsurface investigations in the same areas.

Therefore, it appears possible that hydrocarbons reaching these Chevron wells may have migrated down to the sand lens, but not into the deeper aquifer. This would also explain the elevated concentrations detected in well MW-20B and the high PID readings detected

at a similar depth during Chevron's installation of well R-1D. It is also not clear whether impacts to the sand lens within the silt layer have the potential to impact RCWD well 118 instead of merely remaining trapped within the sand lens. Based on the available data, there appears to be approximately 4 to 6 feet of silt below this sand lens that would protect the deeper aquifer drawn by RCWD well 118.

Evaluation of the potential migration pathway of hydrocarbons near the Chevron site is complicated by the fact that Chevron has had it's own release of petroleum hydrocarbons, including significant quantities of free product. This released product was potentially smeared across a large area when water levels below the Chevron site dropped more than 60 feet during the late 1980s, or the product may have migrated preferentially down conduits such as the four deep Chevron wells. This product was then likely trapped below groundwater when groundwater levels recharged in the early 1990s and may continue to act as an ongoing source of hydrocarbons, including MTBE.

Based on this data, it is not known whether or not hydrocarbons from the 76 station reached any of these four Chevron wells and, if they did, whether the hydrocarbons reached the deeper aquifer via these potential conduits.

Other Wells

The other active drinking water wells identified in the area are over 1/2 mile away from the 76 station and, therefore, appear unlikely to be affected by the petroleum hydrocarbon impacts identified in the vicinity of the 76 station.

Occupants of Structures

The risk to occupants from migration of vapor-phase hydrocarbons into nearby structures has not been evaluated. However, based on the assessment to date, the only structures located close enough to the hydrocarbon release to be a potential concern appears to be the 76 station building and possibly the Denny's restaurant. However, Tosco has been operating an SVE system onsite to remediate vapor-phase hydrocarbons at the site, which will likely limit vapor-phase hydrocarbons from migrating to these potential receptors.

RECOMMENDATIONS FOR ADDITIONAL INVESTIGATION

Based on this SCM and the identified uncertainties regarding the available data, TRC recommends the following:

- Tosco should continue remediation of petroleum hydrocarbons in shallow soil and groundwater at the 76 station.

- The planned aquifer test in cooperation with the RCWD and consultants for other sites should be performed.

- Chevron should continue to assess the potential affects their four deep wells may have had on hydrocarbon migration and the potential for historical Chevron releases to act as an ongoing source of impacts to deeper groundwater.

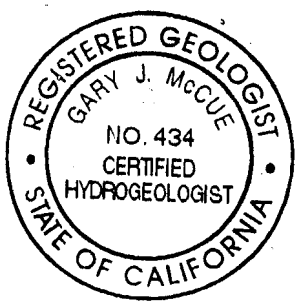
- After the results of these additional investigations are known, TRC will modify this SCM and make additional recommendations, as appropriate.

Please call us at (858) 505-8881 or Dan Fischman, Tosco Marketing, at (714) 428-7717 if you have any questions.

Sincerely,

TRC

Jerome Jamimet, Jr.
Project Scientist



Gary J. McCue, RG 5886, CHG 434
Principal Hydrogeologist

Enclosures:
Figure 1: Vicinity Map Showing Location of Identified Water Wells
Figure 2: Site Plan Showing Cross Section Line
Figure 3: Cross Section A-A'
Figure 4: Shallow Groundwater Elevation Map
Figure 5: Dissolved-Phase MTBE Concentration Map - Shallow Zone
Figure 6: Dissolved-Phase MTBE Concentration Map - Within Aquitard
Figure 7: Dissolved-Phase MTBE Concentration Map - Below Aquitard

cc:
Mr. Dan Fischman, Tosco Marketing
Mr. Barry Pulver, CRWQCB
Mr. Ian Hutchison, TRC
Mr. Kelly Winters, Riverside HMD

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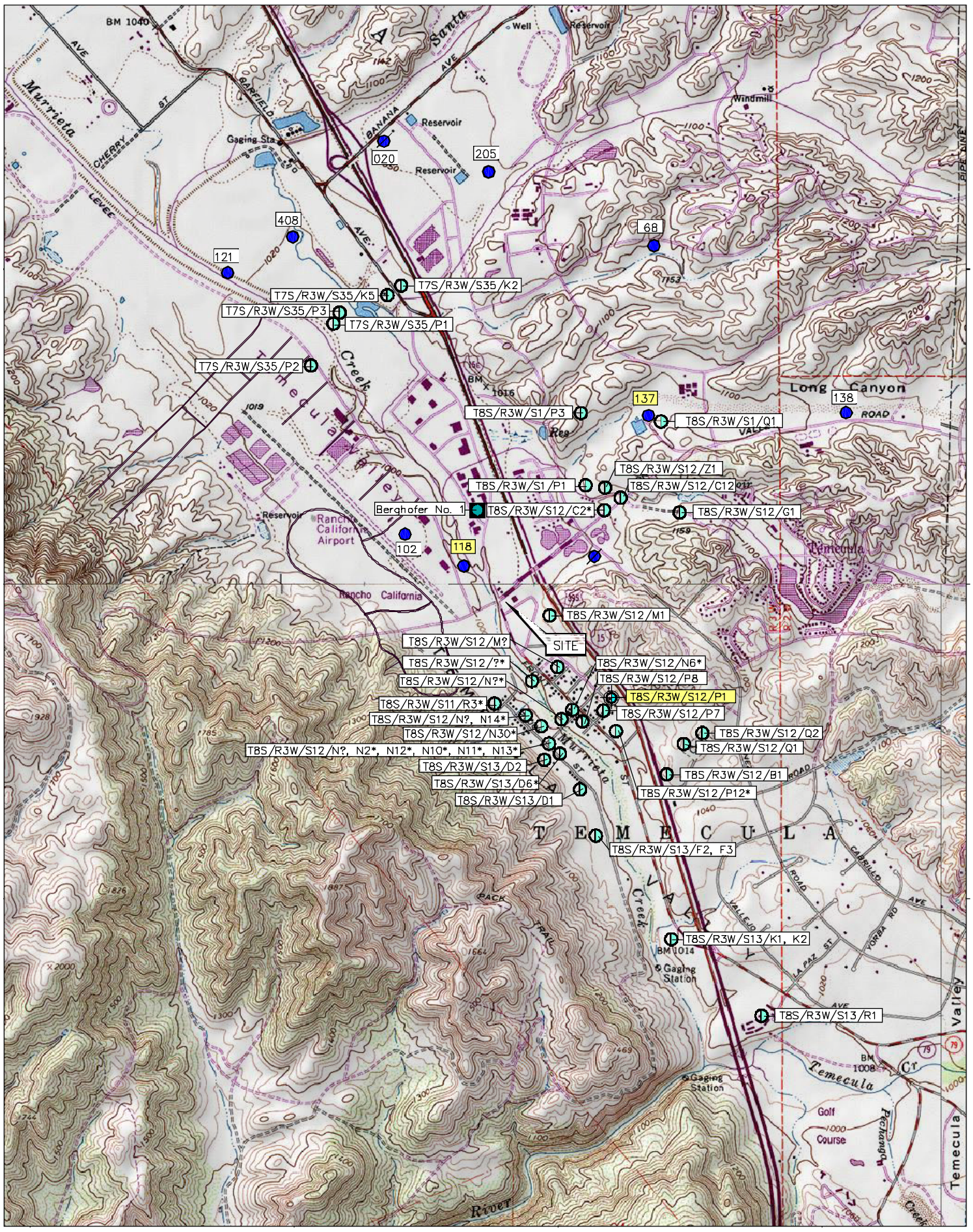


LEGEND

121 Rancho California Water District (RCWD) Water Well

020 Destroyed (RCWD) Water Well

Exploratory Oil Well

Kid's World School Drinking Water Well

Well mapped or listed by California Department of Water Resources (CDWR)

0 1/4 1/2 3/4 1 MILE

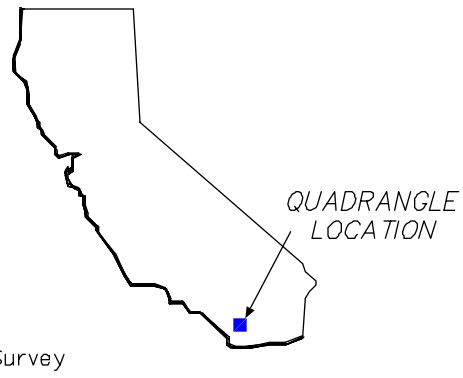
SCALE 1: 2,400'

NOTES:

Locations of RCWD Wells based on review of Geotracker Website 1/16/01. Well ID's highlighted in yellow have been field verified to exist. Base map updated with roads based on locations and scale in the Thomas Guide 2001, Riverside County. * = well locations not mapped by CDWR; TRC estimated location based on DWR listed information. All dimensions and locations are estimated.

SOURCE:

United States Geological Survey
7.5 Minute Topographic Map:
Murrieta and Temecula Quadrangles



VICINITY MAP SHOWING LOCATION OF IDENTIFIED WATER WELLS

76 Station 6519
28903 Rancho California Road
Temecula, California

FIGURE 1

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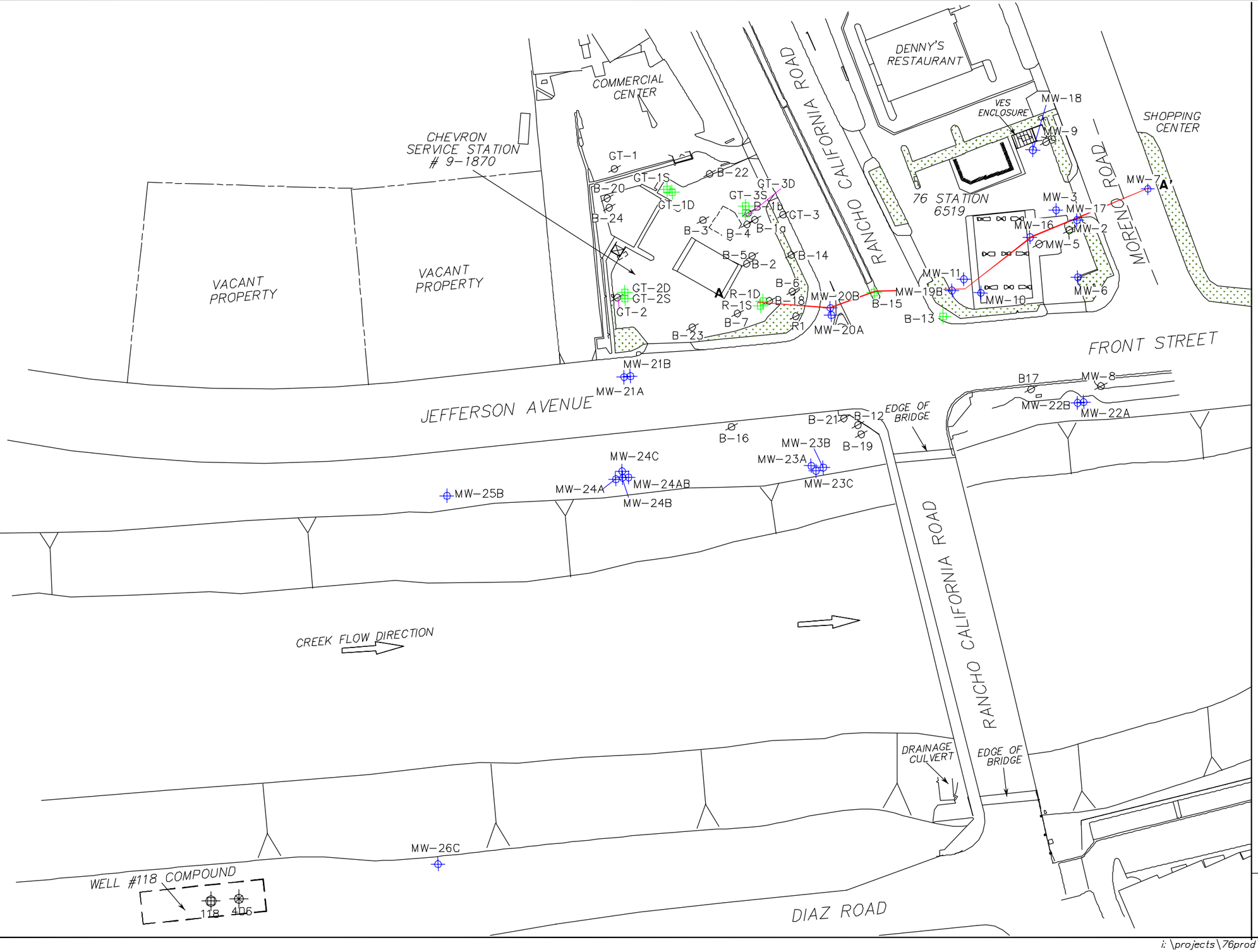

NOTES:

USTs = underground storage tanks. VES = vapor extration system. All dimensions and locations are estimated.

SOURCE:

Figures redrawn from blueprints by Harding Lawson and Associates. Chevron Ground and Grade Plan, blueprints by Holmes and Narver, aerial survey provided by Project Design Consulant, and survey provided by O.K.O. Engineering Inc. Chevron monitoring wells installed by Groundwater Technology, and Harding Lawson and Associates. 76 monitoring wells installed by TRC.

SITE PLAN SHOWING CROSS SECTION LINE

76 Station 6519
28903 Rancho California Road
Temecula, California

TRC

FIGURE 2

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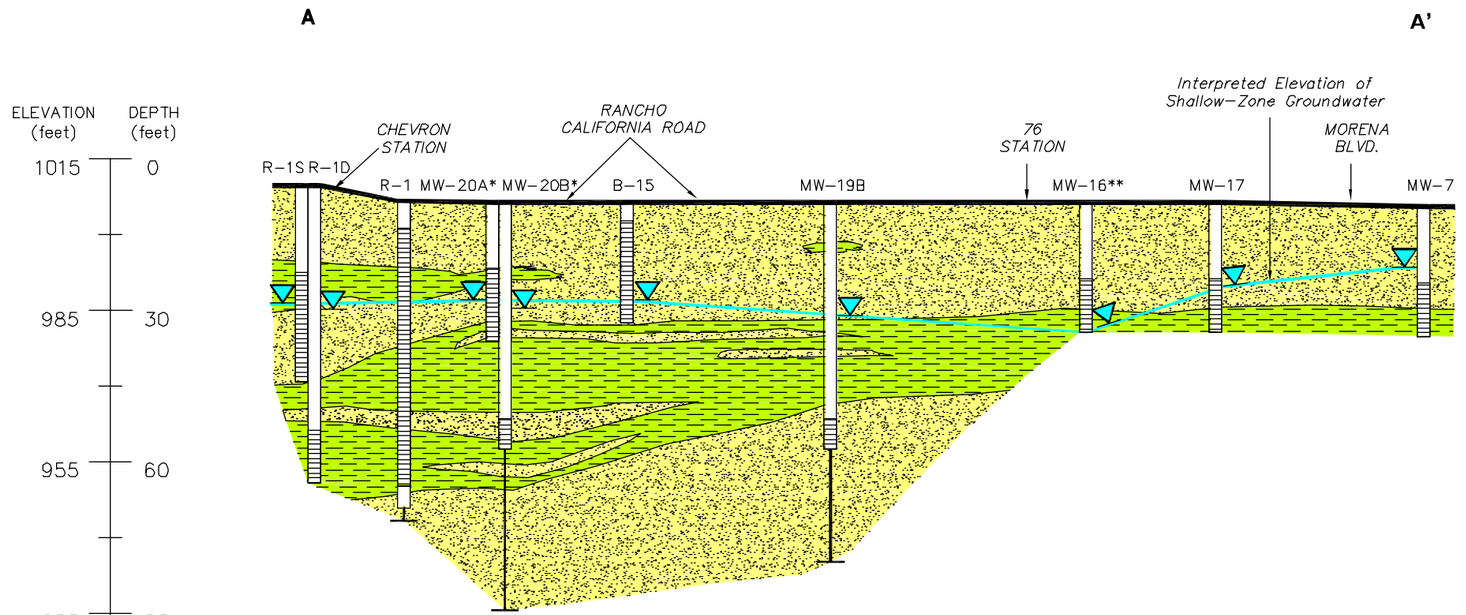

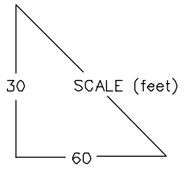

PS = 1:60

NOTES:

* = Lithology from MW-20A and R-1 boring logs not used in stratigraphic interpretation. ** = groundwater being pumped from MW-16, groundwater elevation interpreted to be at bottom of well. Elevations are in feet above mean sea level. See Figure 5 for location of Cross Section. This is one interpretation of the data; other interpretations are possible. All dimensions and locations are estimated.

LEGEND

- Monitoring Well
- Blank PVC Casing
- Screened PVC Casing
- Total Boring Depth
- Groundwater Elevation from May 29-31, 2002 Sampling Event
- Silty Sand, Clayey Sand, Sand, Minor Gravely Sand, and Minor Gravel
- Silt, Clay, Clayey Silt, Silty Clay, Sandy Silt, and Sandy Clay

CROSS SECTION A-A'

76 Station 6519
28903 Rancho California Road
Temecula, California

FIGURE 3

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N

COMMERCIAL CENTER

CHEVRON SERVICE STATION # 9-1870

VACANT PROPERTY

VACANT PROPERTY

RANCHO CALIFORNIA ROAD

DENNY'S RESTAURANT

VES ENCLOSURE

SHOPPING CENTER

76 STATION 6519

MORENO ROAD

FRONT STREET

JEFFERSON AVENUE

EDGE OF BRIDGE

CREEK FLOW DIRECTION

DRAINAGE CULVERT

EDGE OF BRIDGE

WELL #118 COMPOUND

DIAZ ROAD

GT-1S 987.54

GT-1D

GT-3S 987.70

GT-3D

GT-2D

GT-2S 987.98

R-1D

R-1S 989.12

MW-20B

MW-20A 987.55

B-15 989.55

B-13 999.32

MW-19B

MW-11 980.68*

MW-10 980.57*

MW-16 981.28*

MW-3 991.05

MW-17 990.91

MW-18 985.21

MW-7 994.39

MW-6 991.04

MW-21B

MW-21A 986.72

MW-24C

MW-24A 987.55

MW-24AB

MW-24B

MW-25B

MW-23B

MW-23A 988.43

MW-23C

MW-22B

MW-22A 988.98

MW-26C

118

4D6

983 985 987 989 991 993 995 997 999

981 983 985 987 989 991 993

987 989 991 993

997 995 993 991 989

SCALE (FEET)

0 100

LEGEND

MW-7 — 76 Monitoring Well with Groundwater Elevation (feet)

GT1 — Chevron Monitoring Well with Groundwater Elevation (feet)

118 — Rancho California Water District Production Well

406 — Rancho California Water District Monitoring Well

993.00 — Groundwater Elevation Contour*

General Direction of Groundwater Flow

NOTES:

* = Based on Measured Depth to Water only in wells screened through water table. * = well was dry due to active pumping/dewatering as part of remediation system operation. Water elevation assumed to be at the bottom of well's screened interval. USTs = underground storage tanks. VES = vapor extraction system. All dimensions and locations are estimated.

SOURCE:

Figures redrawn from blueprints by Harding Lawson and Associates. Chevron Ground and Grade Plan, blueprints by Holmes and Narver, aerial survey provided by Project Design Consulant, and survey provided by O.K.O. Engineering Inc. Chevron monitoring wells installed by Groundwater Technology, and Harding Lawson and Associates. 76 monitoring wells installed by TRC.

GROUNDWATER ELEVATION CONTOUR MAP - SHALLOW ZONE
May 29, 2002

76 Station 6519
28903 Rancho California Road
Temecula, California

TRC

FIGURE 4

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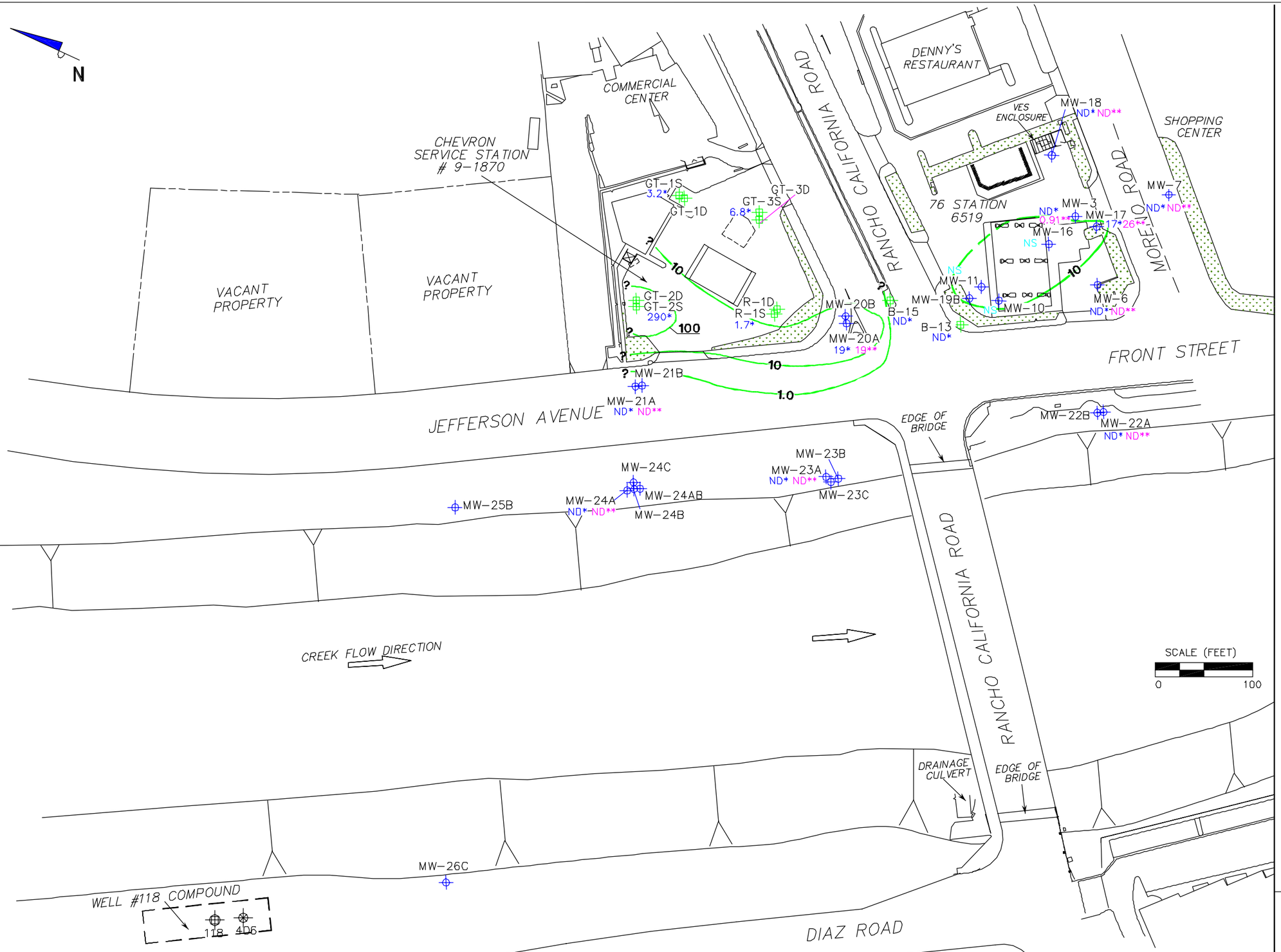

LEGEND

MW-18 — 76 Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)

GT-1S — Chevron Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)

118 — Rancho California Water District Production Well

406 — Rancho California Water District Monitoring Well

10 — Dissolved-Phase MTBE Concentration (ug/l). Dashed where inferred and queried where unknown.

NOTES:

* = prepurge groundwater sample. ** = postpurge groundwater sample. The highest concentration from the two sampling methods was used in the concentration contour. NS = not sampled; wells pumped dry due to remediation system pumping. MTBE = methyl tertiary butyl ether. Contour lines are interpretive based on laboratory analysis results of groundwater samples. ug/l = micrograms per liter. USTs = underground storage tanks. VES = vapor extraction system. All dimensions and locations are estimated.

SOURCE:

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SCALE (FEET)
0 100

DISSOLVED-PHASE MTBE CONCENTRATION MAP - SHALLOW ZONE
May 29 - 31, 2002

76 Station 6519
28903 Rancho California Road
Temecula, California

TRC

FIGURE 5

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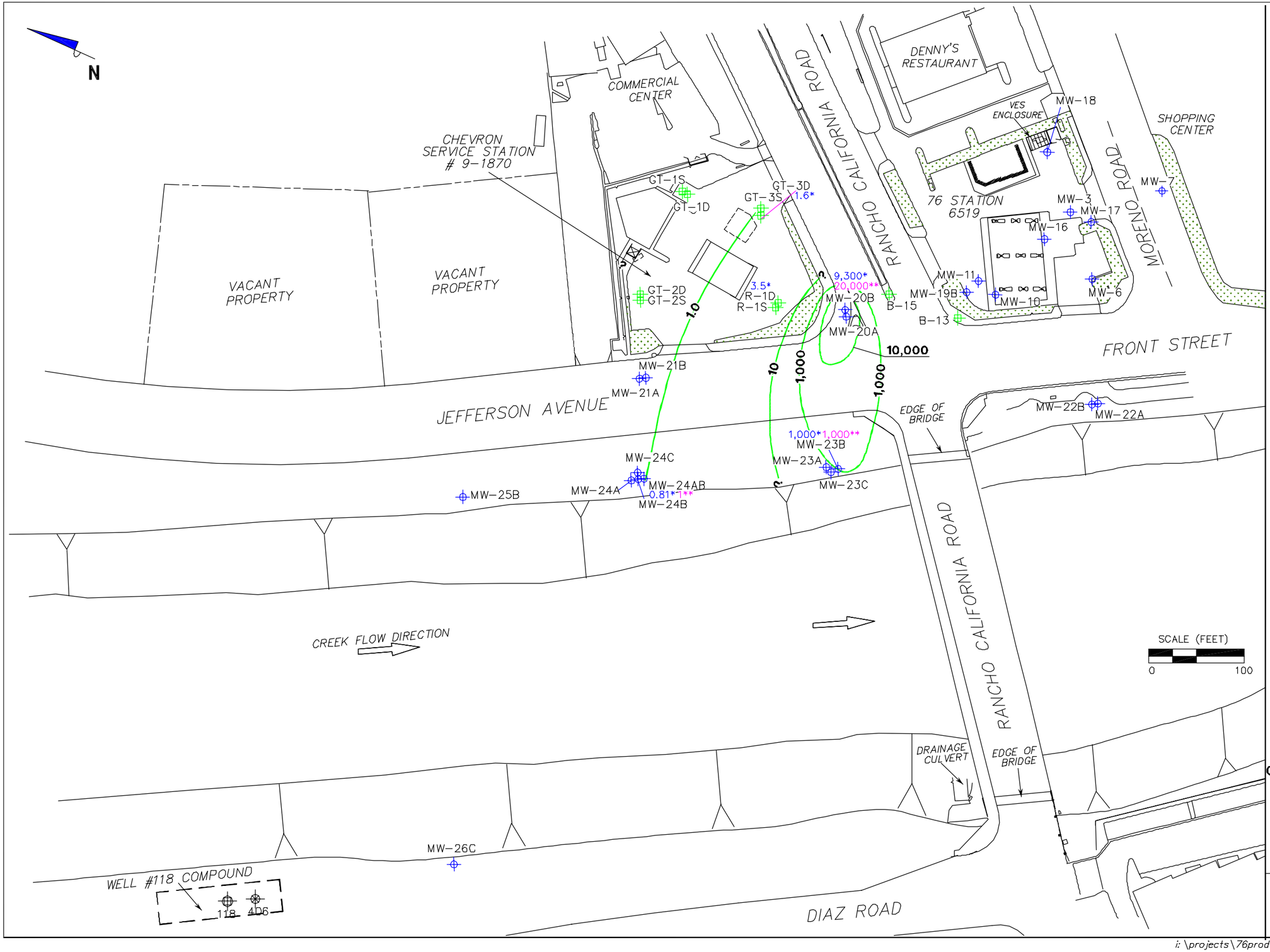

LEGEND

- MW-20B — 76 Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)
- GT-3D — Chevron Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)
- 118 — Rancho California Water District Production Well
- 406 — Rancho California Water District Monitoring Well
- 10 — Dissolved-Phase MTBE Concentration (ug/l)

NOTES:

* = prepurge groundwater sample. ** = postpurge groundwater sample. The highest concentration from the two sampling methods was used in the concentration contour. MTBE = methyl tertiary butyl ether. Contour lines are interpretive based on laboratory analysis results of groundwater samples. ug/l = micrograms per liter. USTs = underground storage tanks. VES = vapor extraction system. All dimensions and locations are estimated.

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DISSOLVED-PHASE MTBE CONCENTRATION MAP - WITHIN AQUITARD
May 29 - 31, 2002

76 Station 6519
28903 Rancho California Road
Temecula, California

TRC

FIGURE 6

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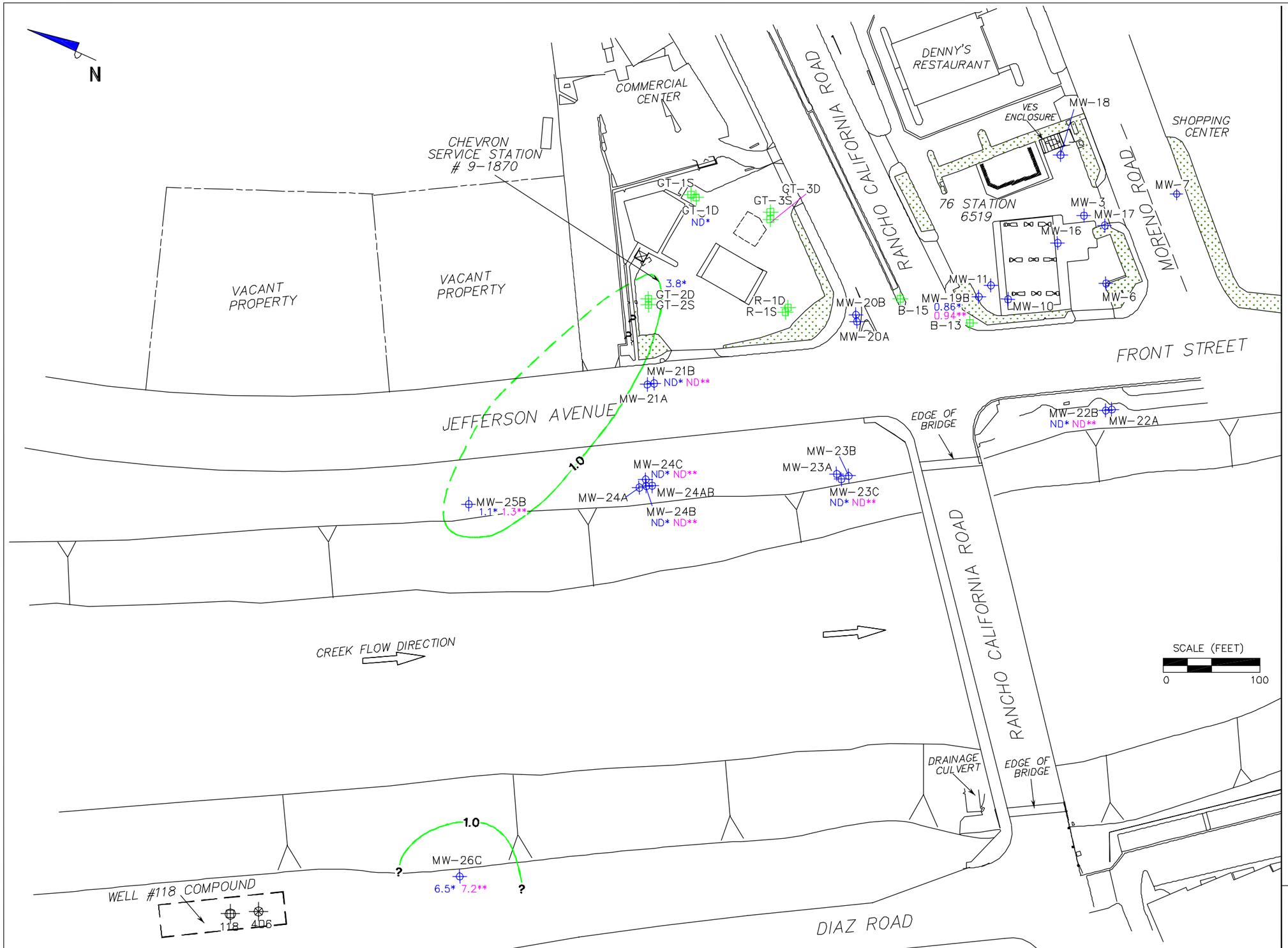

LEGEND

MW-19B — 76 Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)

GT-1D — Chevron Monitoring Well with Dissolved-Phase MTBE Concentration (ug/l)

118 — Rancho California Water District Production Well

406 — Rancho California Water District Monitoring Well

1.0 — Dissolved-Phase MTBE Concentration (ug/l)

NOTES:

* = prepurge groundwater sample. ** = postpurge groundwater sample. The highest concentration from the two sampling methods was used in the concentration contour. MTBE = methyl tertiary butyl ether. Contour lines are interpretive based on laboratory analysis results of groundwater samples and dashed where inferred. ug/l = micrograms per liter. USTs = underground storage tanks. VES = vapor extraction system. All dimensions and locations are estimated.

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DISSOLVED-PHASE MTBE CONCENTRATION MAP BELOW AQUITARD May 29 - 31, 2002

76 Station 6519
28903 Rancho California Road
Temecula, California

TRC

FIGURE 7

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