FIGURES

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SECTION 1 FIGURES

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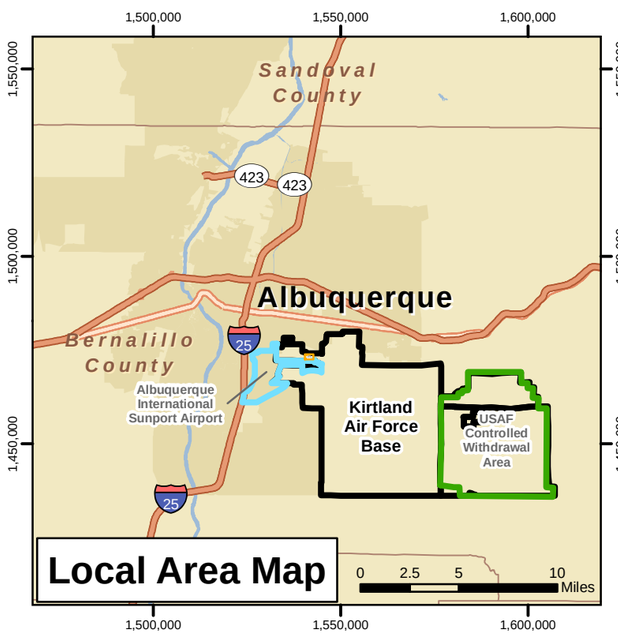

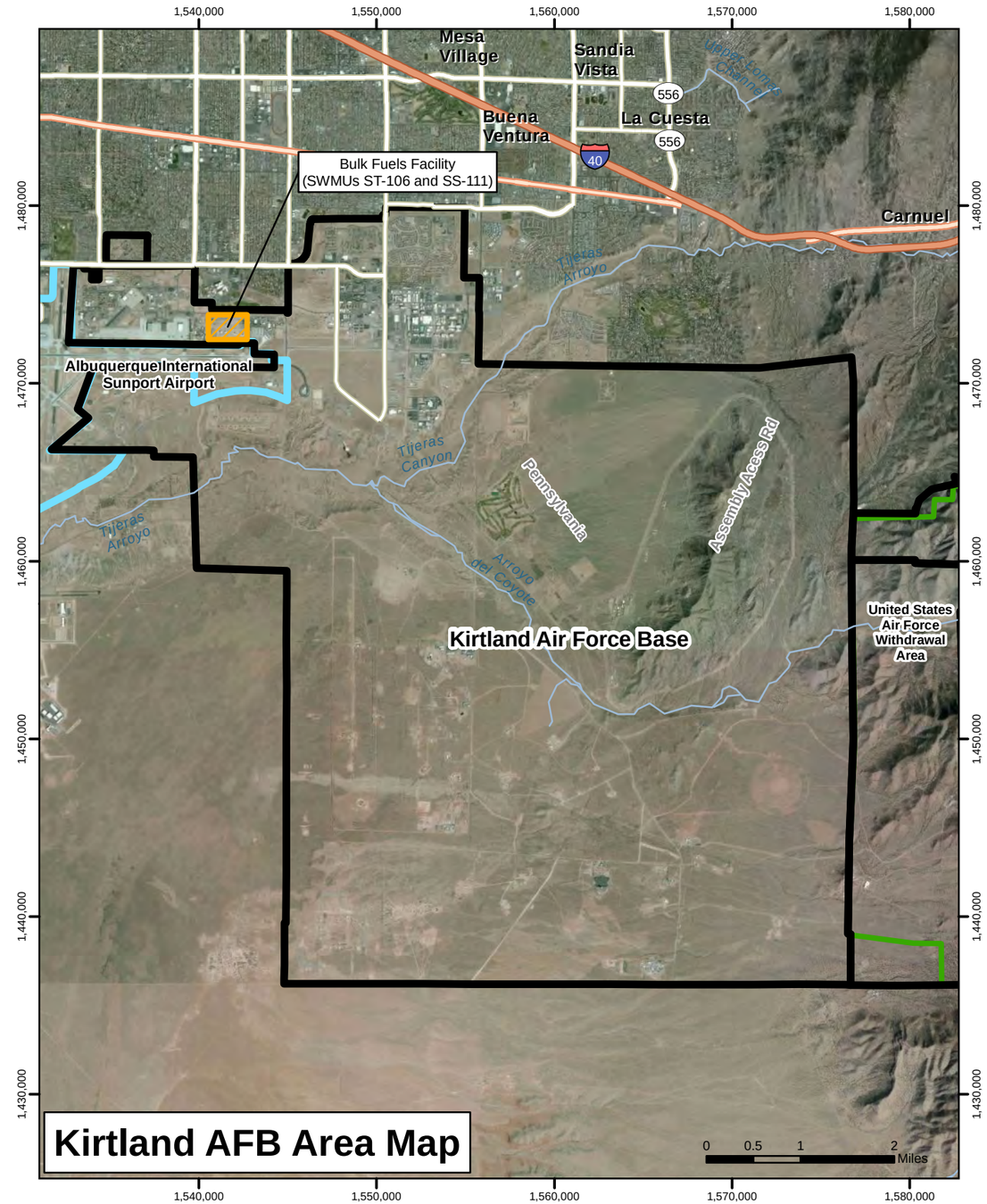

Legend

- Major Highways
- Highways
- Major Roads
- Rivers
- Bulk Fuels Facility (SWMUs ST-106 and SS-111)
- Installation Location
- Kirtland Air Force Base Installation Boundary
- Albuquerque International Sunport Airport
- United States Air Force Withdrawal Area
- Urban Areas
- Counties
- States

N

Revision Date: 09/28/11

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 1-1

SITE LOCATION MAP

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_03\KAFB_001_loc_map.mxd 09/28/11

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SECTION 2 FIGURES

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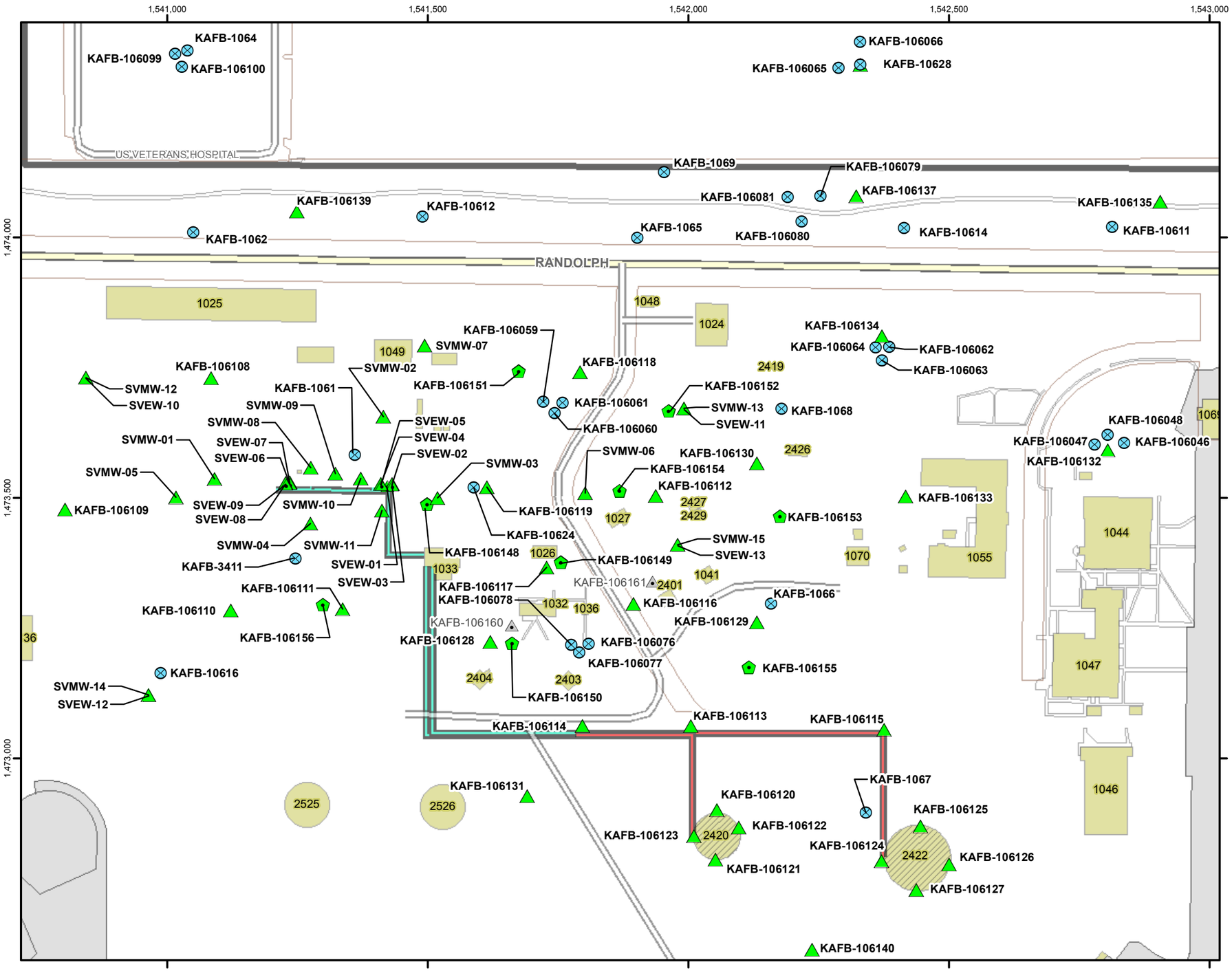
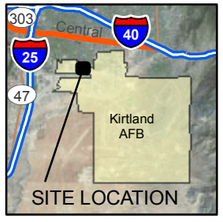


Legend

- Proposed SVE Extraction Well
- Monitor Well
- Pneu Log
- SVE Extraction Well
- SVM Cluster
- Interstate
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/28/12

N

0 100 200 400

Feet

1 inch = 200 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 2-1

LOCATION OF SOIL VAPOR MONITORING AND EXTRACTION WELLS, BULK FUELS FACILITY

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_002_SVE_detail.mxd 02/28/12

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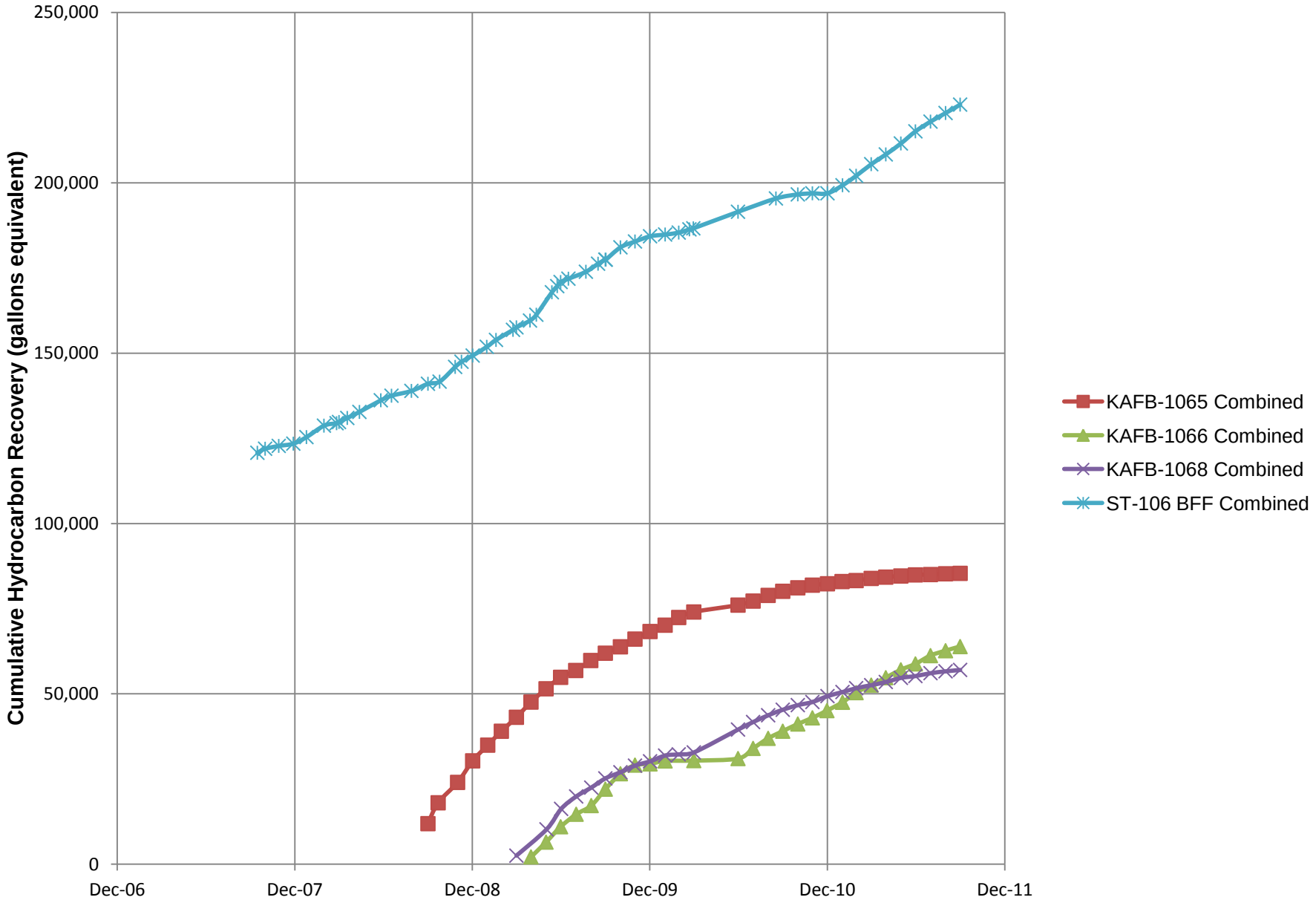
Figure 2-2. SVE Cumulative Mass Recovery Over Time



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SECTION 3 FIGURES

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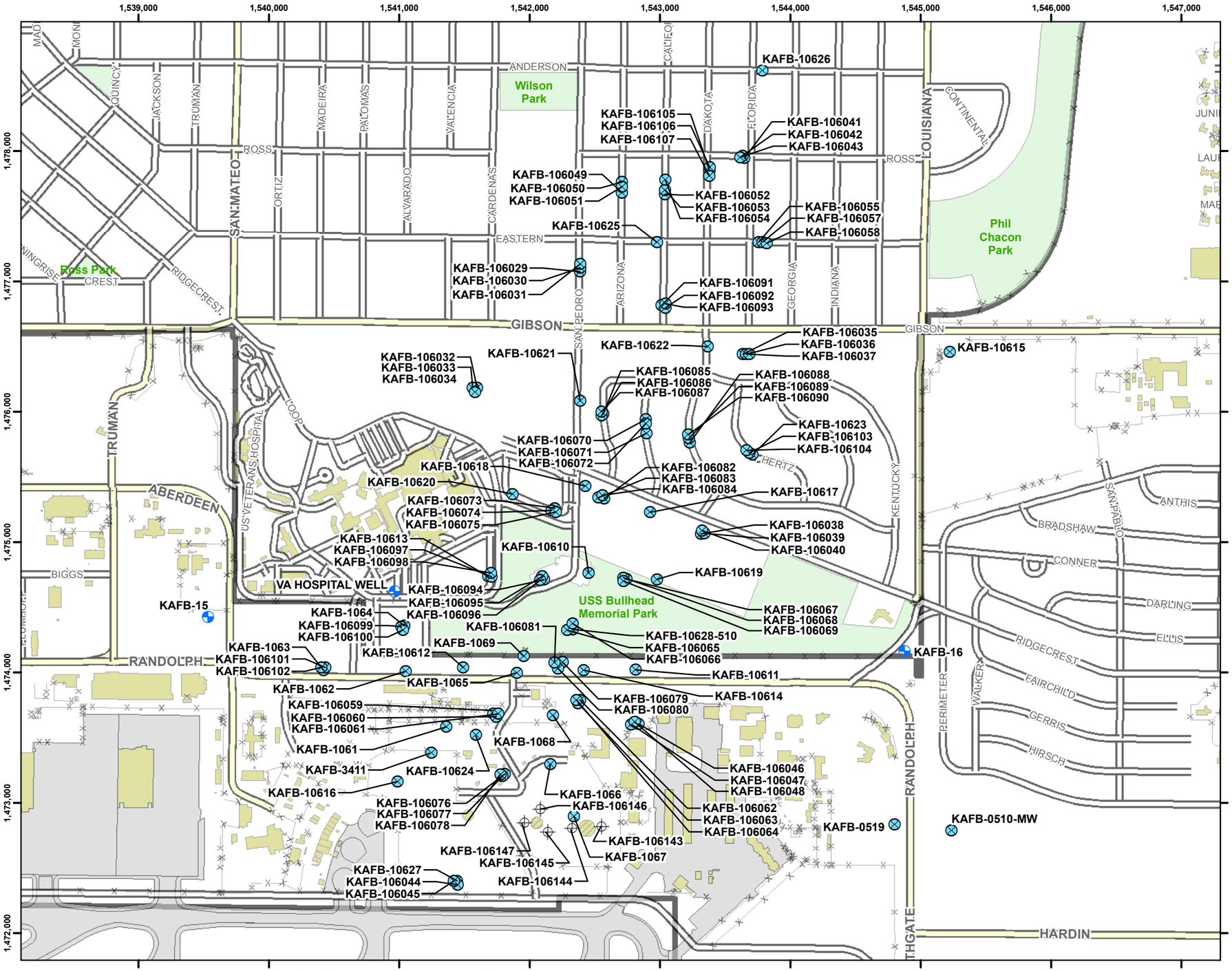
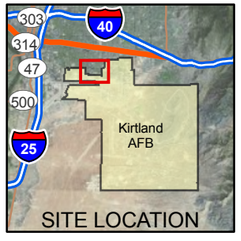


Legend

- Monitor Well
- Water Supply Well
- Borehole
- Fence
- Interstate
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary



N

Revision Date: 02/11/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
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FIGURE 3-1

GROUNDWATER MONITORING WELL AND SOIL BORING LOCATIONS

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_057_GW_BH_locs.mxd 02/11/12

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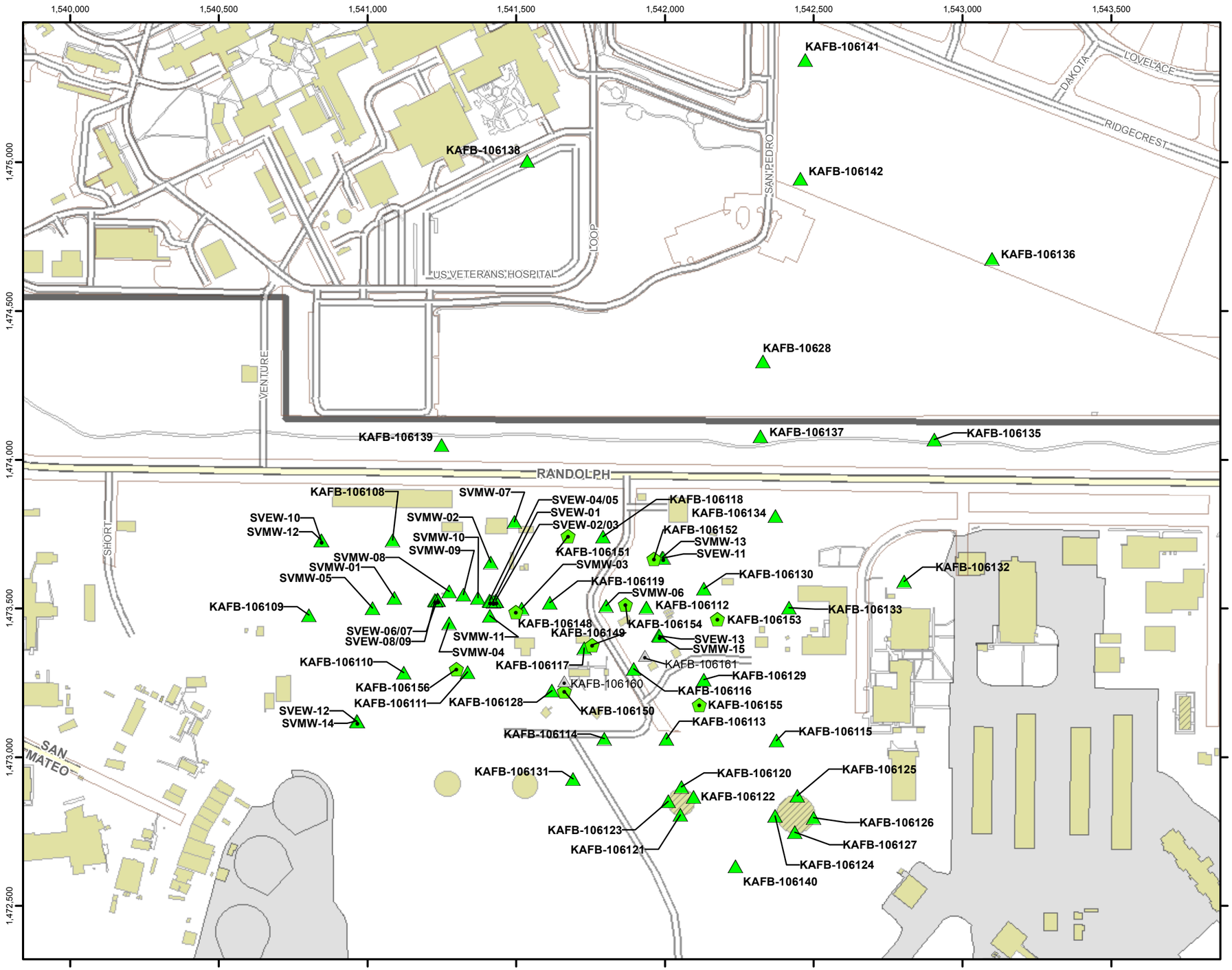
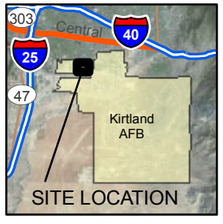


Legend

- Proposed SVE Extraction Well
- Pneulog Cluster
- SVE Extraction Well
- SVM Cluster
- Interstate
- Major Road
- Road
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/28/12

N

0 175 350 700

Feet

1 inch = 350 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-2

SOIL VAPOR MONITORING LOCATIONS

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_003_SVE.mxd 02/28/12

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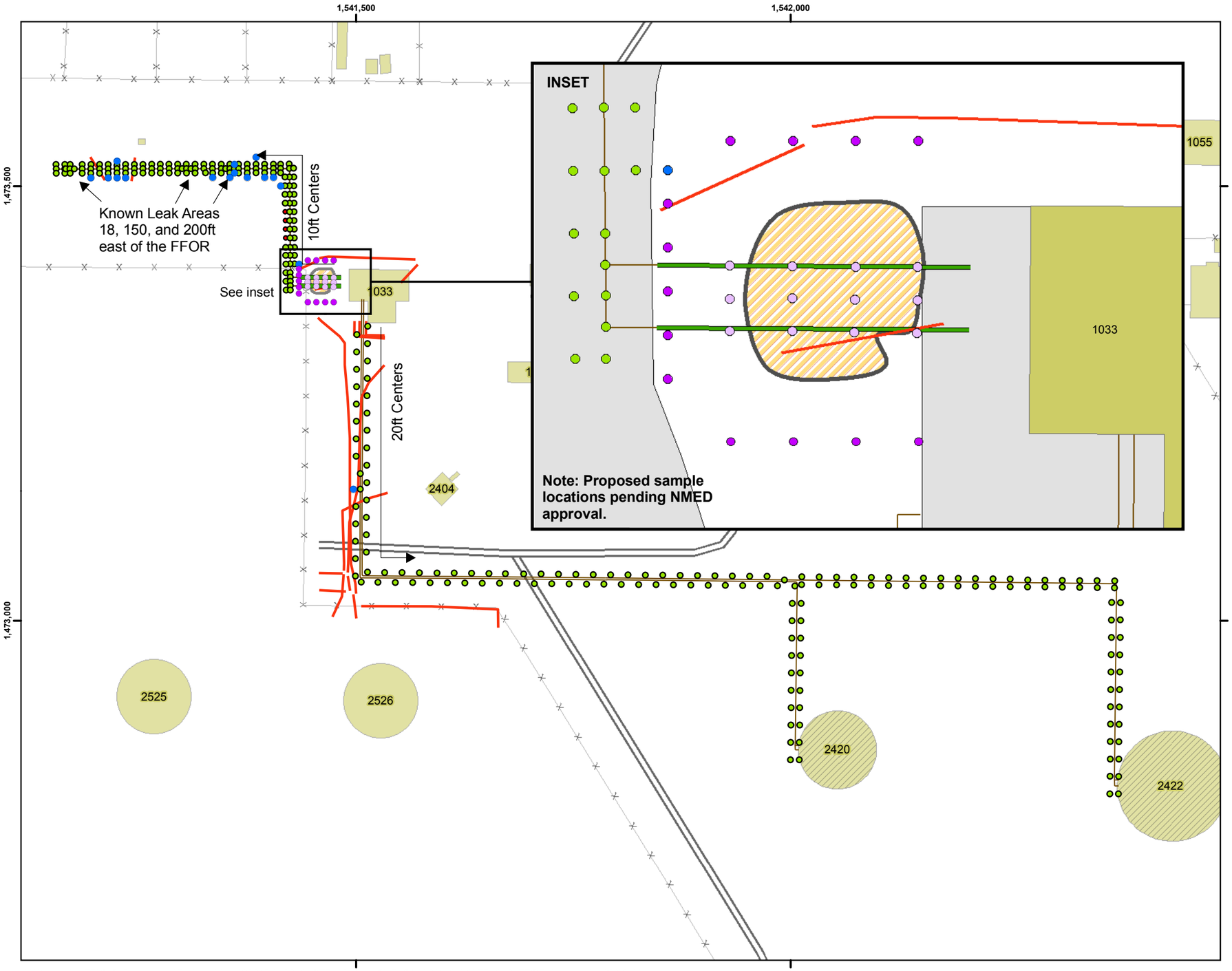
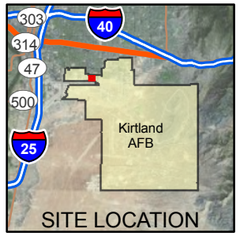


Legend

- Proposed Borehole Locations
- Original Borehole Location Will Not Be Completed Due to Presence of Excavation
- Proposed Step-Out Locations
- Borehole Locations Completed
- Borehole Locations Not Completed
- Former Fuel Lines
- In-Place Fuel Lines
- Electric Utility Line
- Fence
- Interstate
- Major Road
- Road
- Existing Excavation
- Structure
- Previously Existing Structure



Revision Date: 02/23/12

N

0 60 120 240

Feet
1 inch = 120 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-3

FFOR BOREHOLE LOCATIONS

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_058_FFOR_locs.mxd 02/23/12

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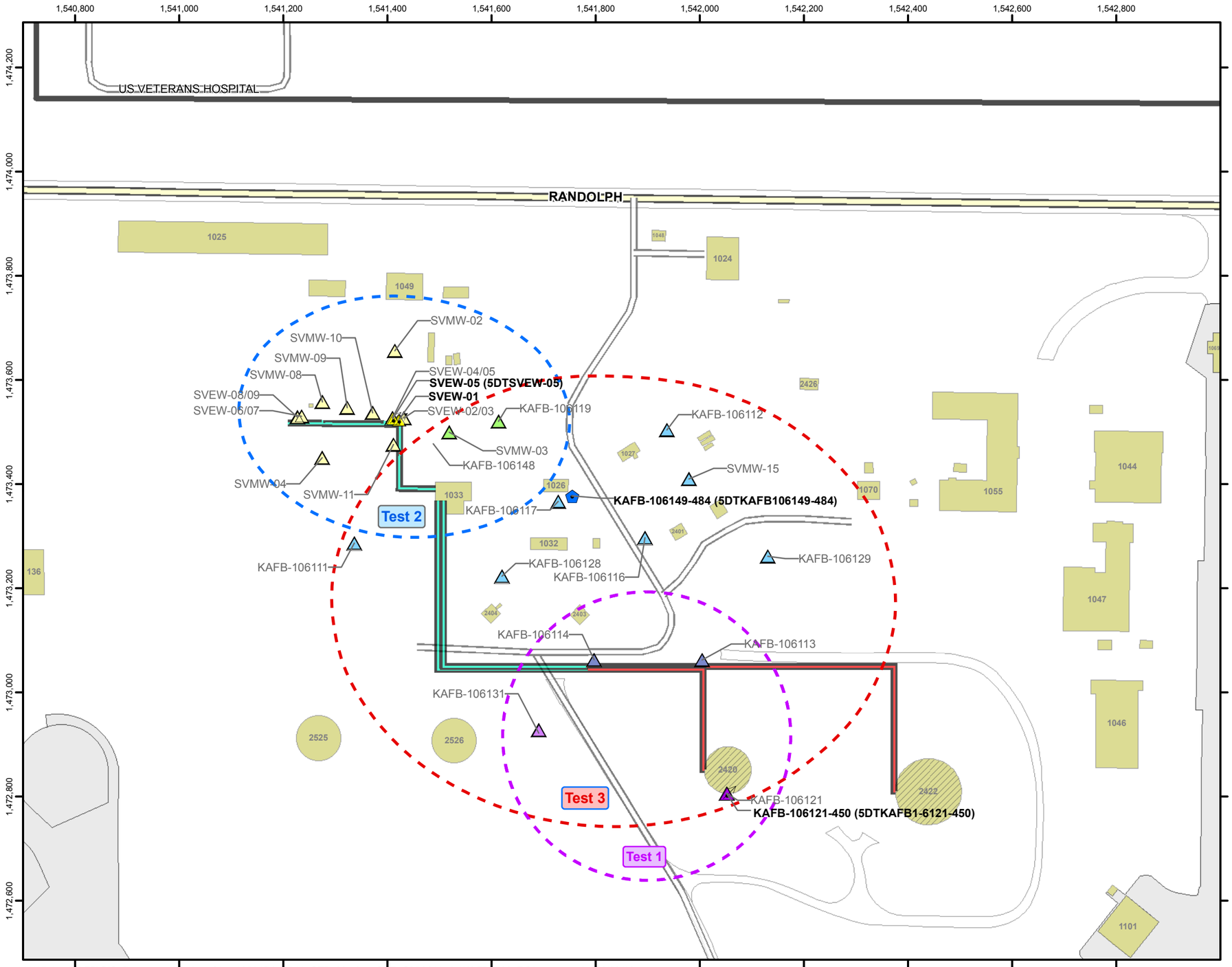
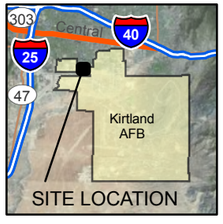


H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_060_ROI_tests.mxd 02/23/12

Legend

- Observation Well Cluster for ROI Test 1
- Extraction Well for ROI Test 1
- Observation Well Cluster for ROI Tests 1 and 3
- Observation Well Cluster for ROI Tests 2 and 3
- Extraction Well and Alternative for ROI Test 2
- Observation Pneulog Well for ROI Test 2
- Observation Well for ROI Test 2
- Extraction Well for ROI Test 3
- Observation Well Cluster for ROI Test 3
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Interstate
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Installation Boundary

Note:
Extraction wells for tests are labeled in **bold** font.
Observation wells for tests are labeled in regular font.



N

Revision Date: 03/16/11

0 100 200 400

Feet
1 inch = 200 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-4

RADIUS OF INFLUENCE TEST WELLS

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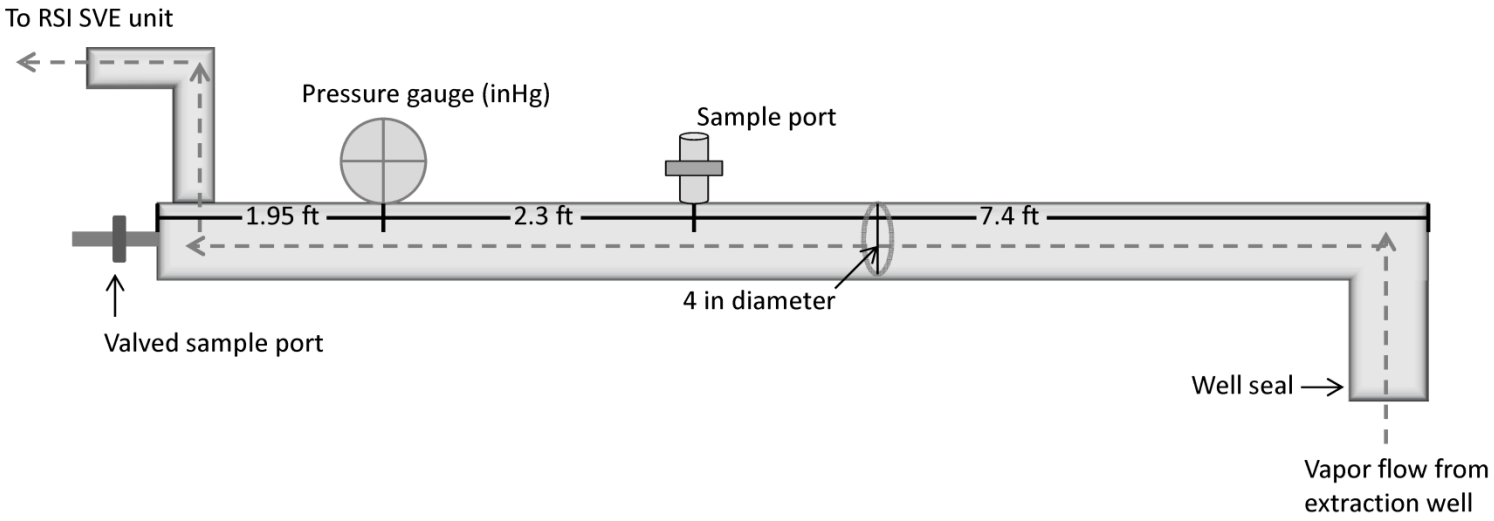

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BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 3-5

TEST WELLHEAD SETUP
FOR USE WITH
RSI SVE UNIT 249

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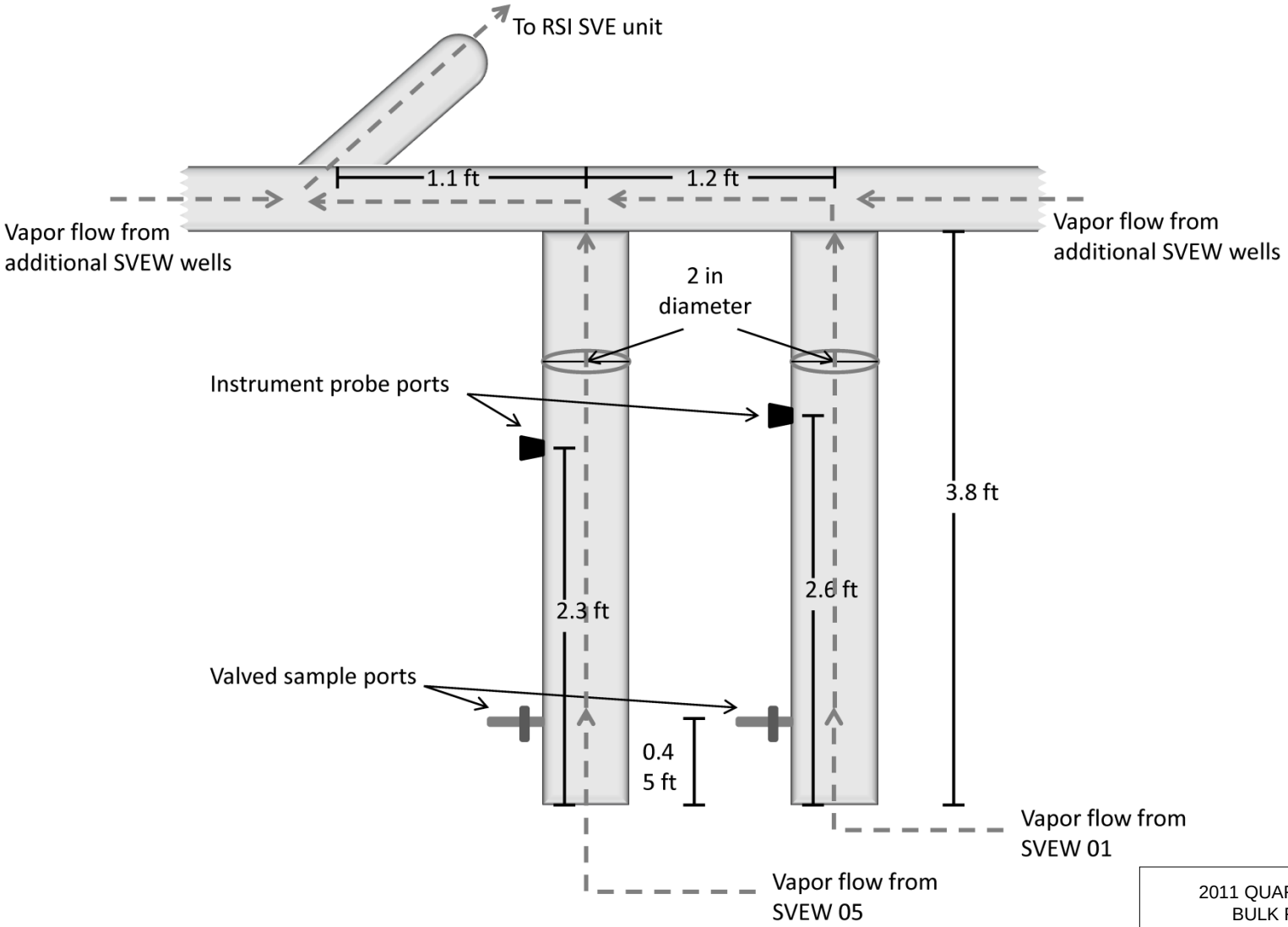

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
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FIGURE 3-6

WELLHEAD SETUP CONNECTED TO
WELLS SVEW-01
THROUGH SVEW-09

KAFB_052_well_const.ppt

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SECTION 4 FIGURES

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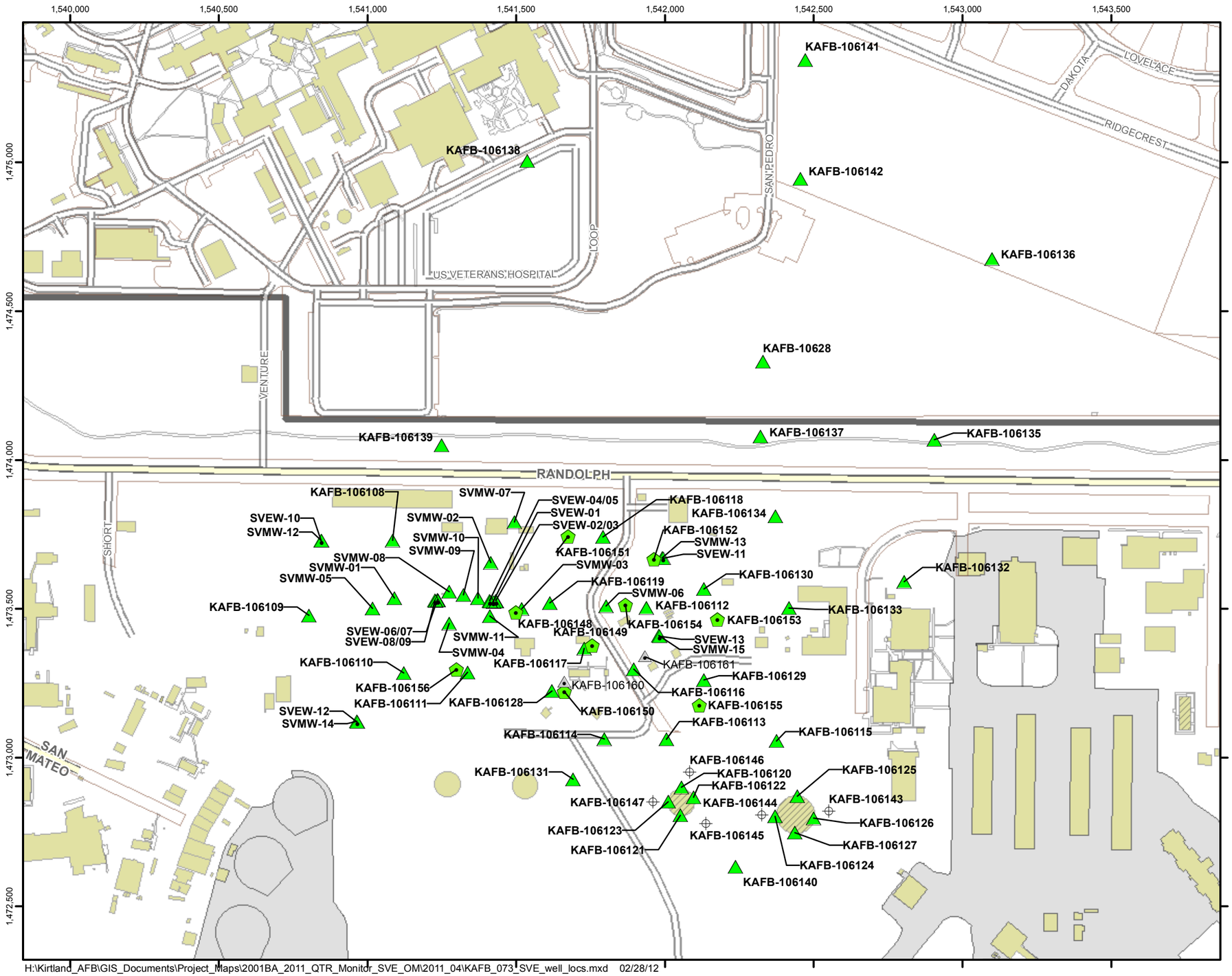
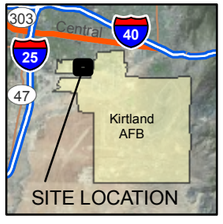


H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_073_SVE_well_locs.mxd 02/28/12

Legend

- Proposed SVE Extraction Well
- Borehole
- Pneulog Cluster
- SVE Extraction Well
- SVM Cluster
- Interstate
- Major Road
- Road
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/28/12

N

0 175 350 700

Feet

1 inch = 350 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4-1

SVE AND SVM
WELL LOCATIONS

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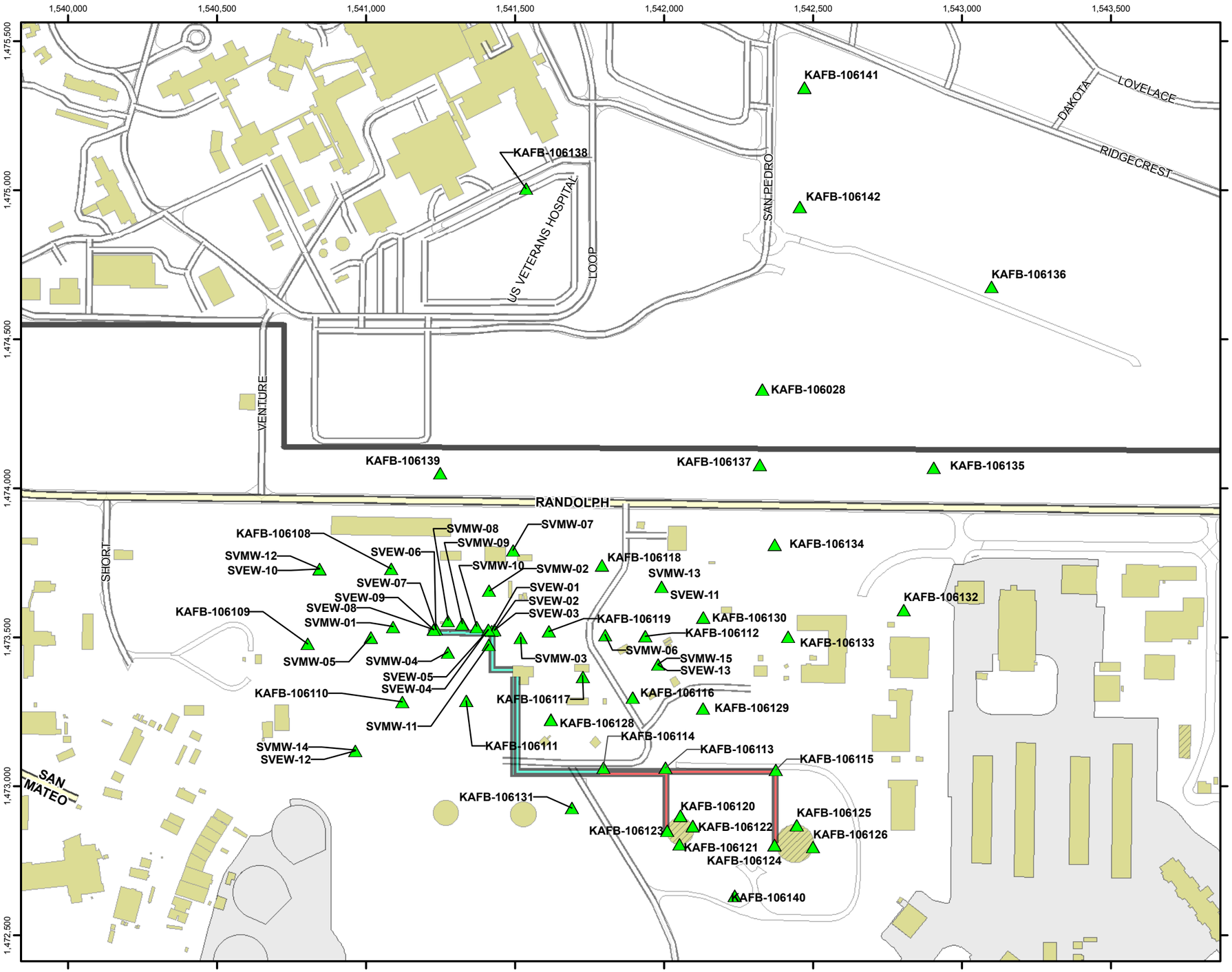
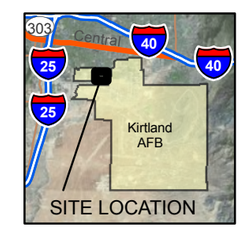


Legend

- SVE/SVM Well
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Interstate
- Major Road
- Road
- Structure
- Runway
- Installation Boundary



Revision Date: 02/22/12

N

0 175 350 700

Feet

1 inch = 350 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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BULK FUELS FACILITY
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FIGURE 4-2

VOC VAPOR
SAMPLE LOCATIONS

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_074_VOC_vapor_locs.mxd 02/22/12

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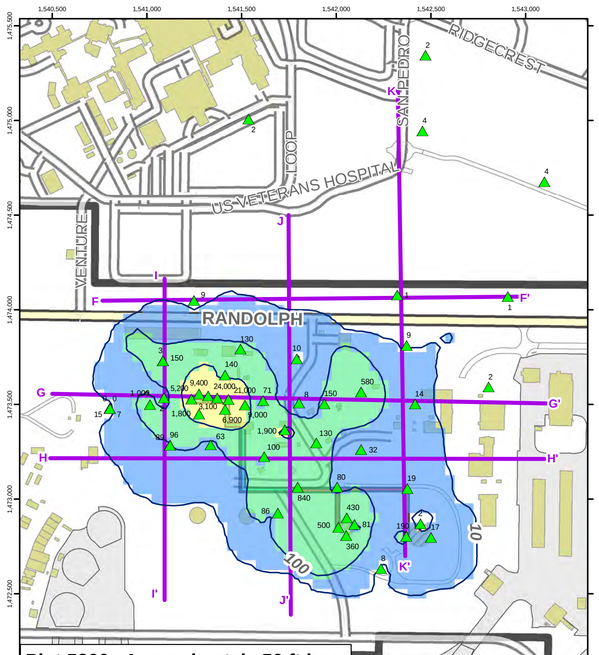
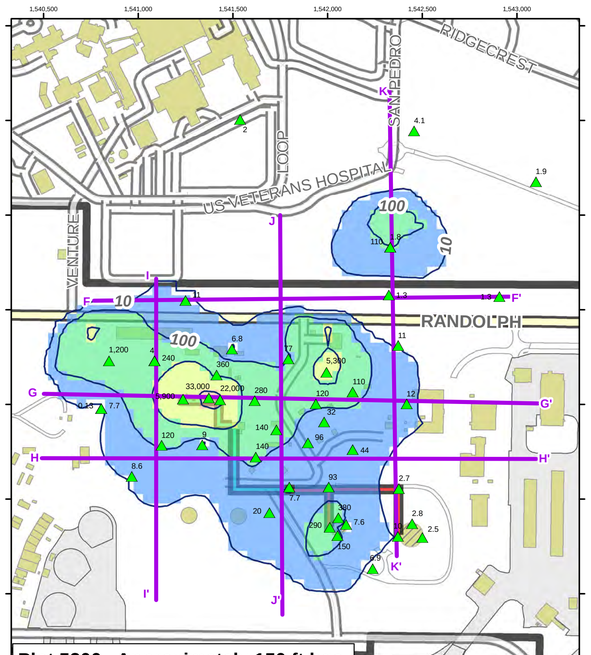
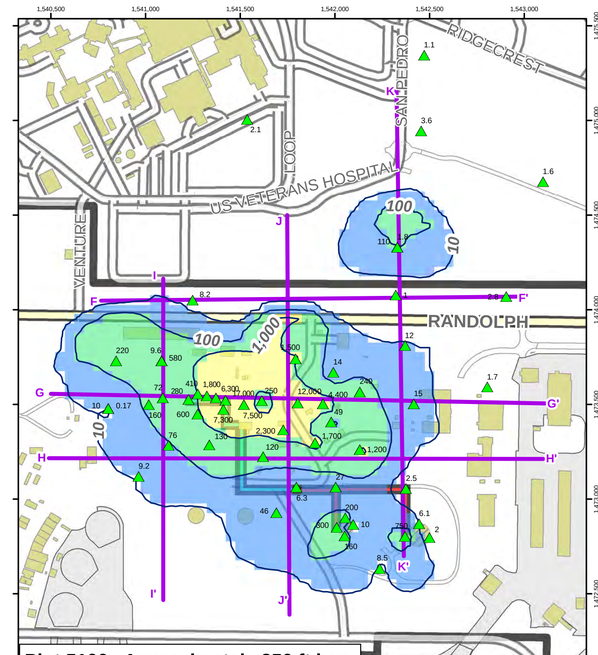
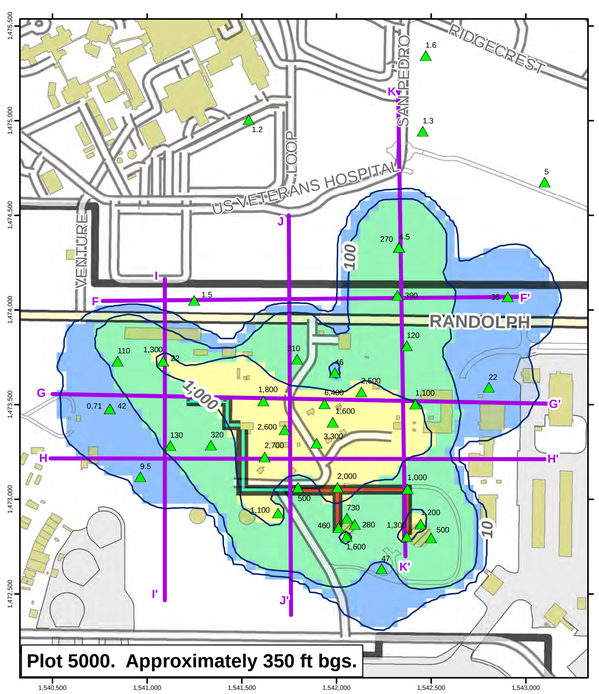








Note:
The vadose zone VOC plume was gridded in three dimensions using inverse distance weighting in RockWorks and then concentration plan-view maps were "cut" at respective elevations. Ground elevations range from 5314 to 5364 ft above mean sea level across the ST-106/SS-111 investigation area.

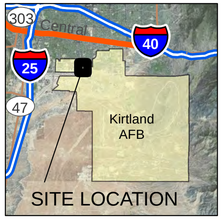
SVE well locations are presented with the total vapor VOC concentration in ppmv for each elevation. Sample results within 25 ft of the elevation are posted. For example, plot 5000 includes sample results within the 5025 to 4075 ft interval. Locations are not shown at elevations where there is no sample result for the elevation interval.

See Figure 4-2 for SVE well locations with ID numbers.

Legend

- SVE/SVM Well with Vapor VOC Concentration (ppmv)
- Cross-Section Line
- VOC Concentration Contour (ppmv)

VOC Concentration (ppmv)
- 10 - 100
- 100 - 1000
- 1000 - 10,000
- >10,000
- Installation Boundary
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Highway
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway



Revision Date: 03/16/12

N

0 400 800 1,600

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4-3

TOTAL VOC VAPOR PLUME FOOTPRINTS BY ELEVATION DECEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_068_Lab_VOC_plan_Dsize.mxd 03/16/12

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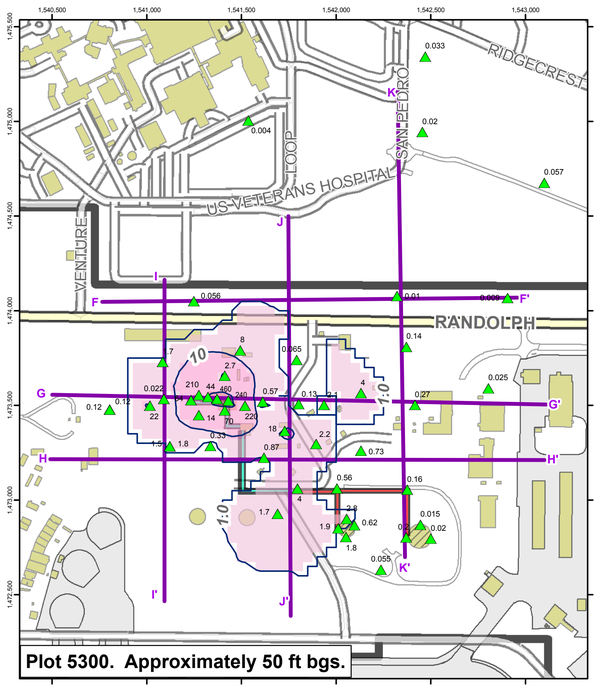
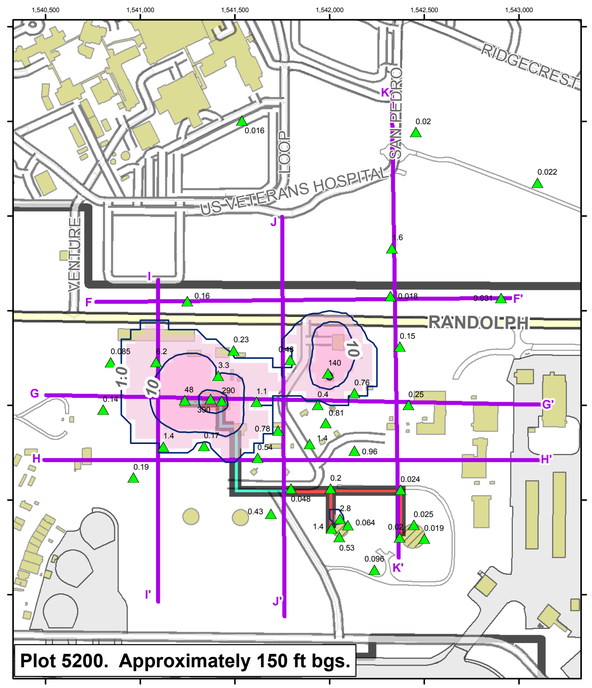
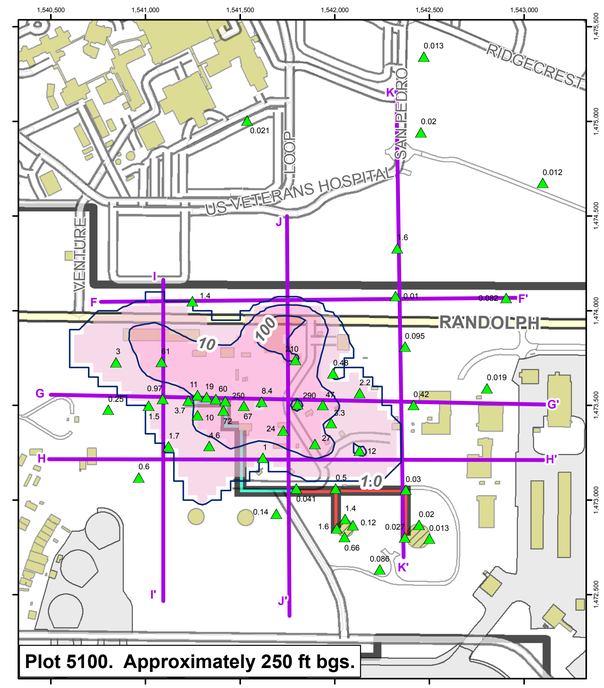


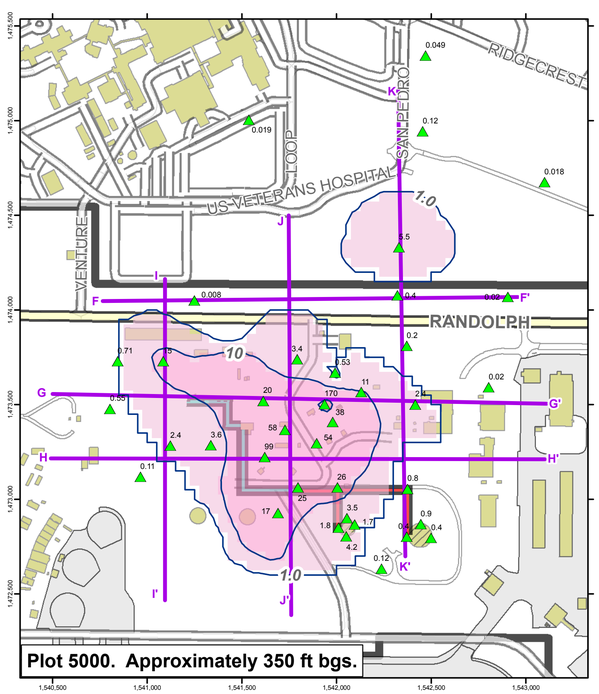
Plot 5300. Approximately 50 ft bgs.



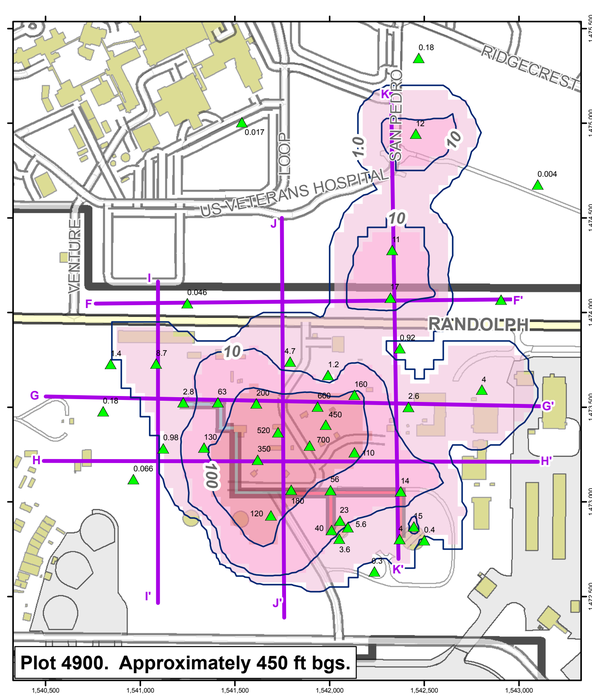
Plot 5200. Approximately 150 ft bgs.



Plot 5100. Approximately 250 ft bgs.



Plot 5000. Approximately 350 ft bgs.



Plot 4900. Approximately 450 ft bgs.

Note:
The vadose zone benzene plume was gridded in three dimensions using inverse distance weighting in RockWorks and then concentration plan-view maps were "cut" at respective elevations. Ground elevations range from 5314 to 5364 ft above mean sea level across the ST-106/SS-111 investigation area.

SVE well locations are presented with the benzene concentration in ppmv for each elevation. Sample results within 25 ft of the elevation are posted. For example, plot 5000 includes sample results within the 5025 to 4075 ft interval. Locations are not shown at elevations where there is no sample result for the elevation interval.

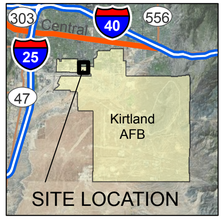
See Figure 4-2 for SVE well locations with ID numbers.

Legend

- SVE Well with Benzene Vapor Concentration (ppmv)
- Cross-Section Line
- Benzene Vapor Concentration Contours (ppmv)

Benzene Concentration (ppmv)

- 0 - 1
- 1.0 - 10
- 10 - 100
- 100 - 139
- Installation Boundary
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Highway
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway



N

0 400 800 1,600

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4-4

BENZENE VAPOR PLUME
FOOTPRINTS BY ELEVATION
DECEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_069_BZ_vapor_plan_Dsize.mxd 02/23/12

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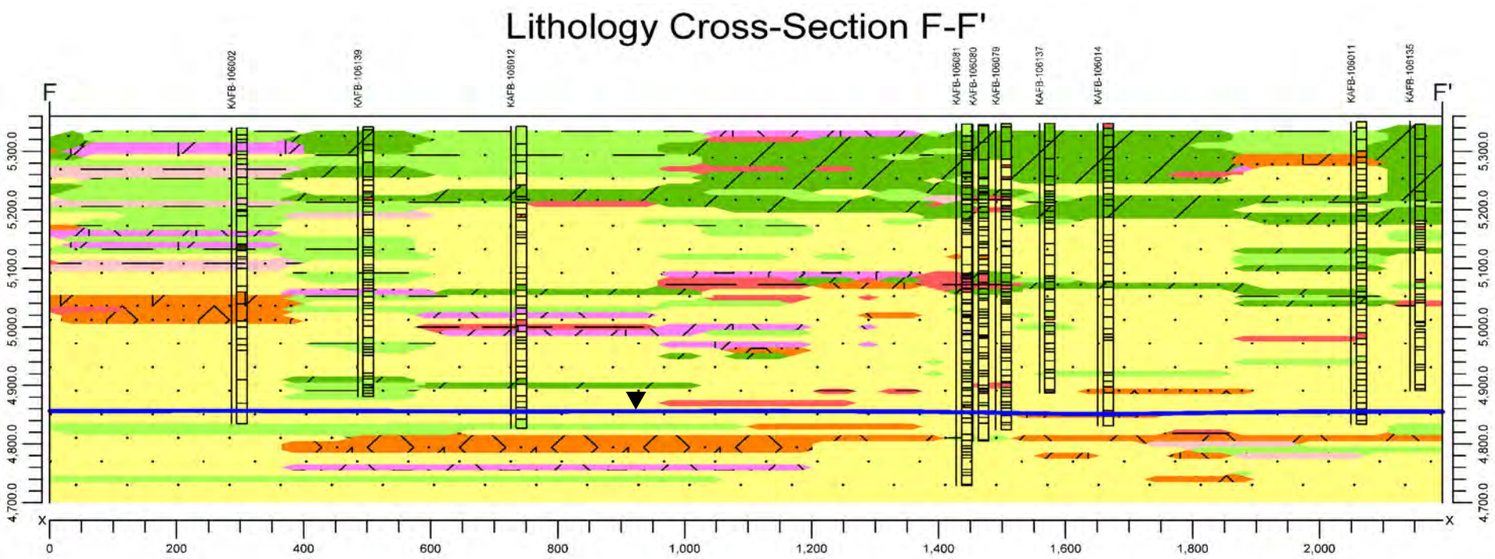
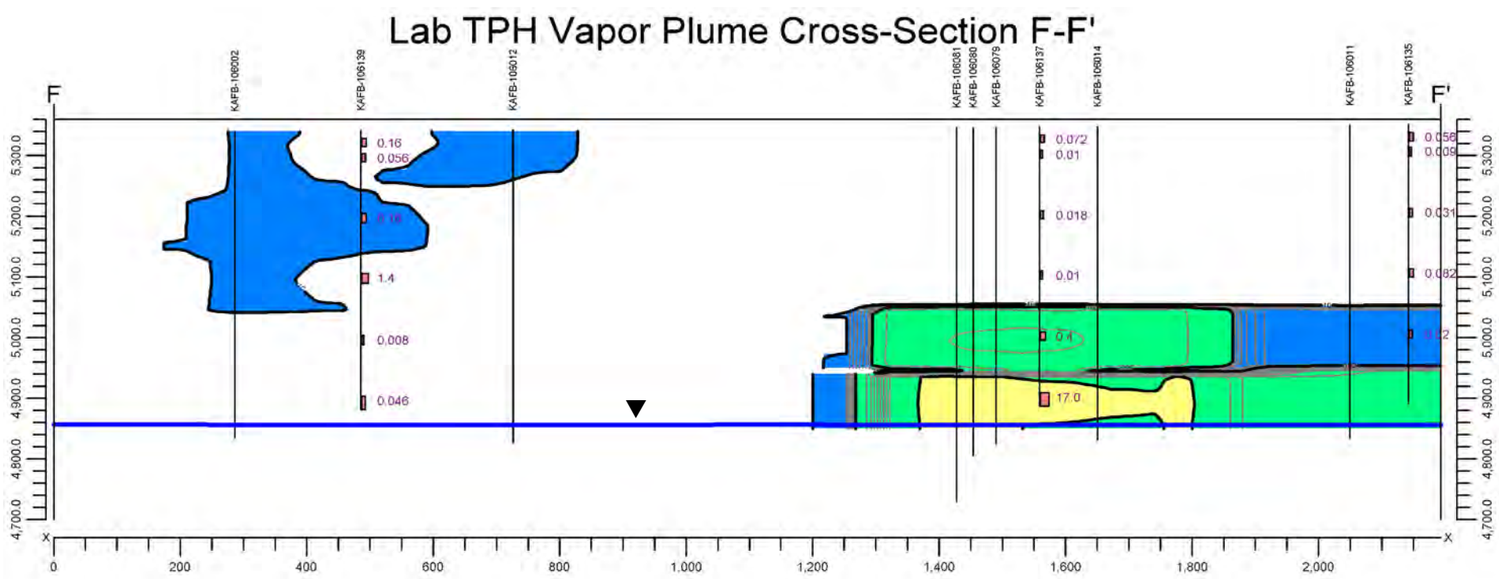




Lithology Index

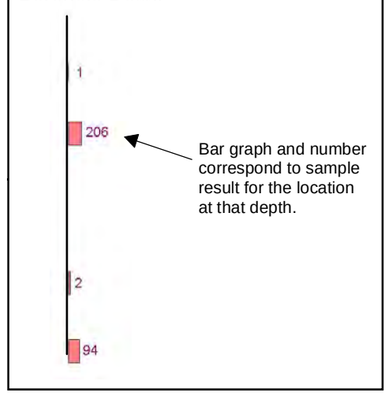
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

Revision Date: 03/16/12

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 4-5

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS F-F'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_075_VOC_vapor_cross_section_FF.mxd 03/16/12

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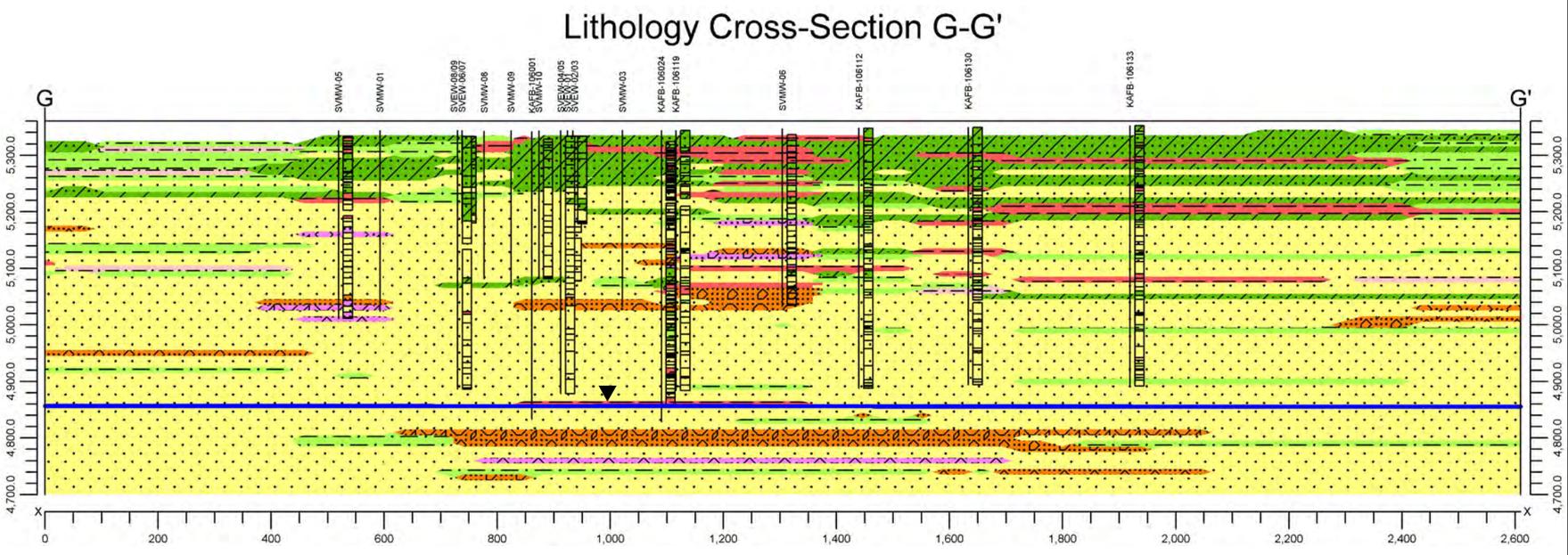
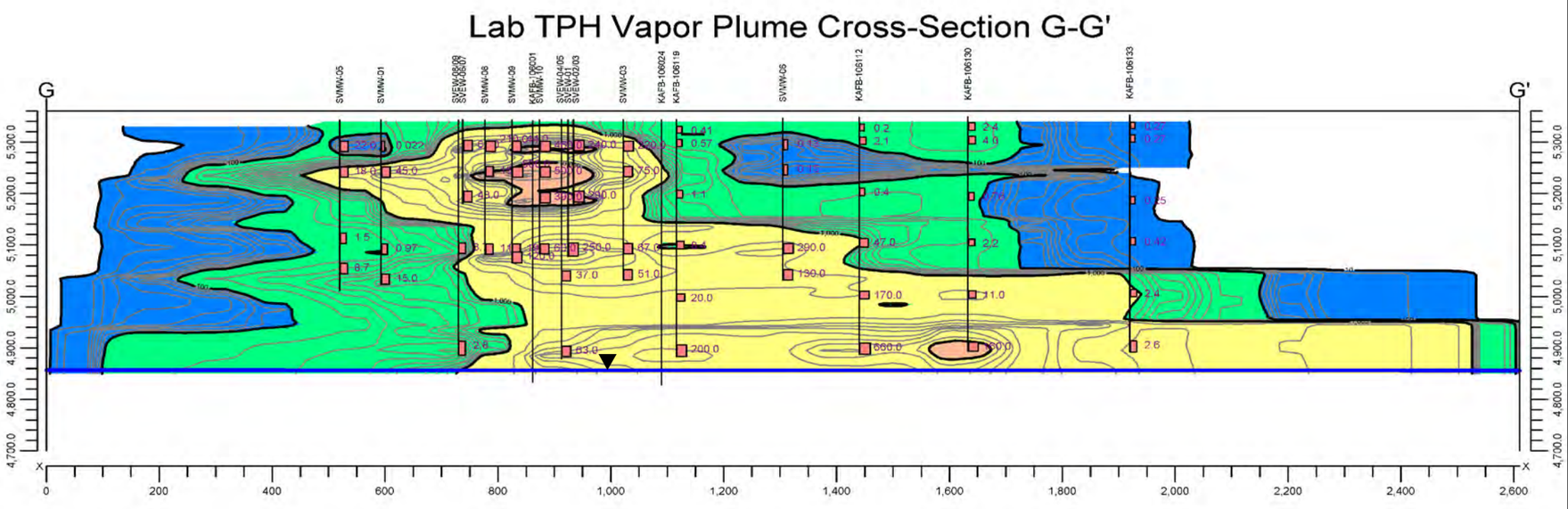




Lithology Index

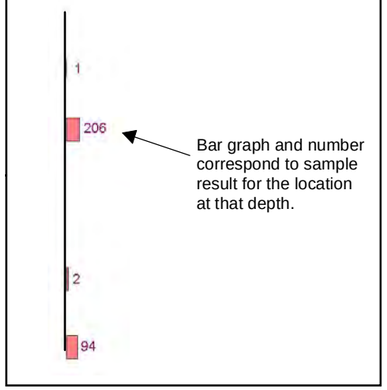
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

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FIGURE 4-6

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS G-G'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_076_VOC_vapor_cross_section_GG.mxd 03/16/12

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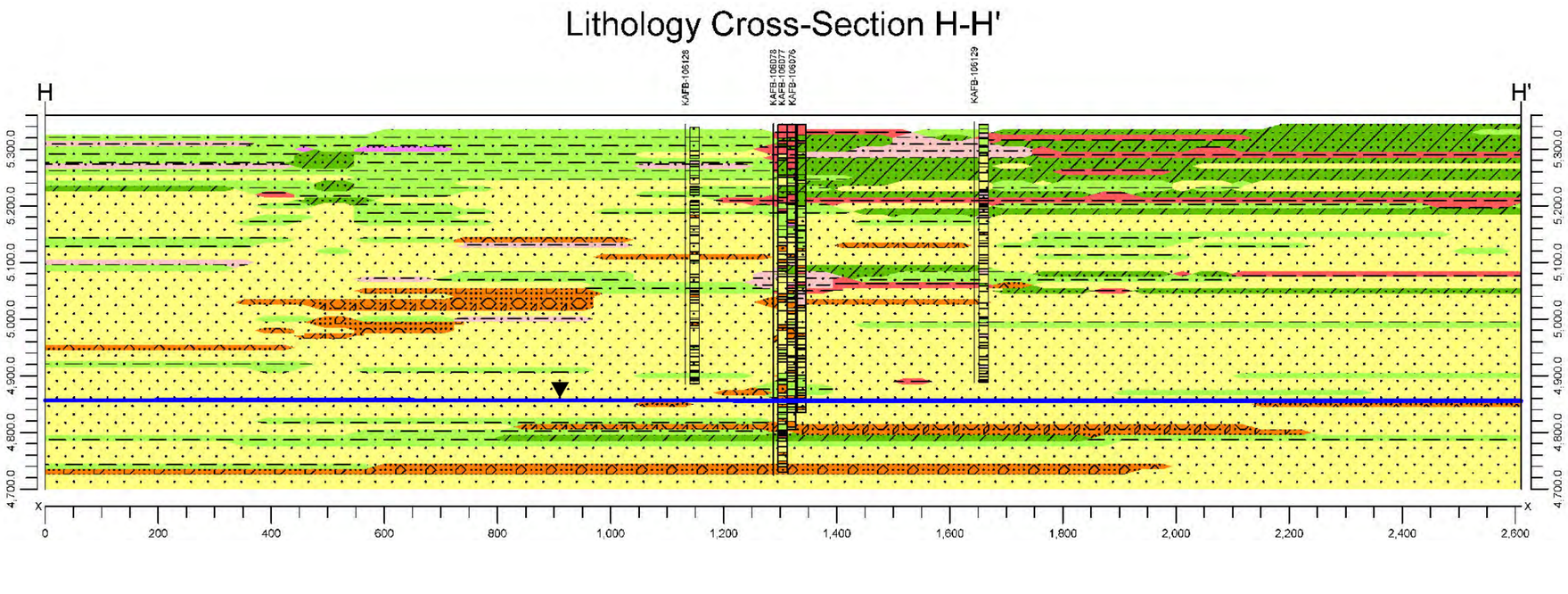
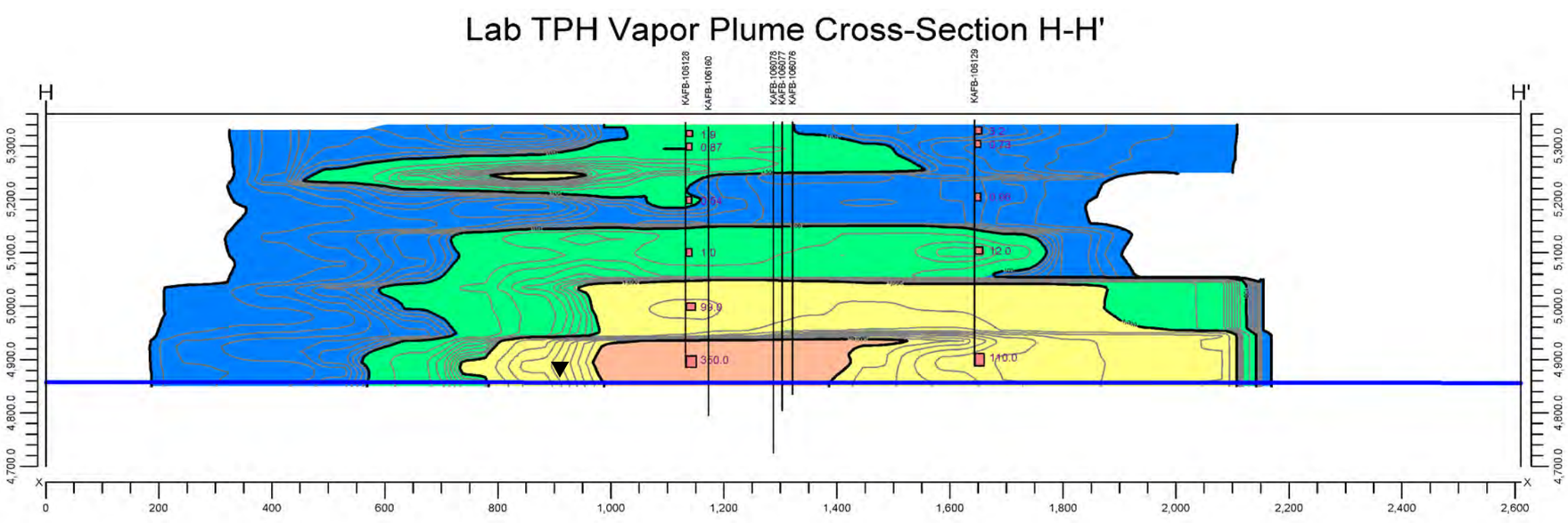




Lithology Index

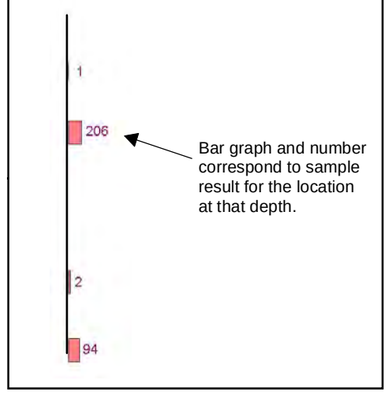
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

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FIGURE 4-7

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS H-H'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_077_VOC_vapor_cross_section_HH.mxd 03/16/12

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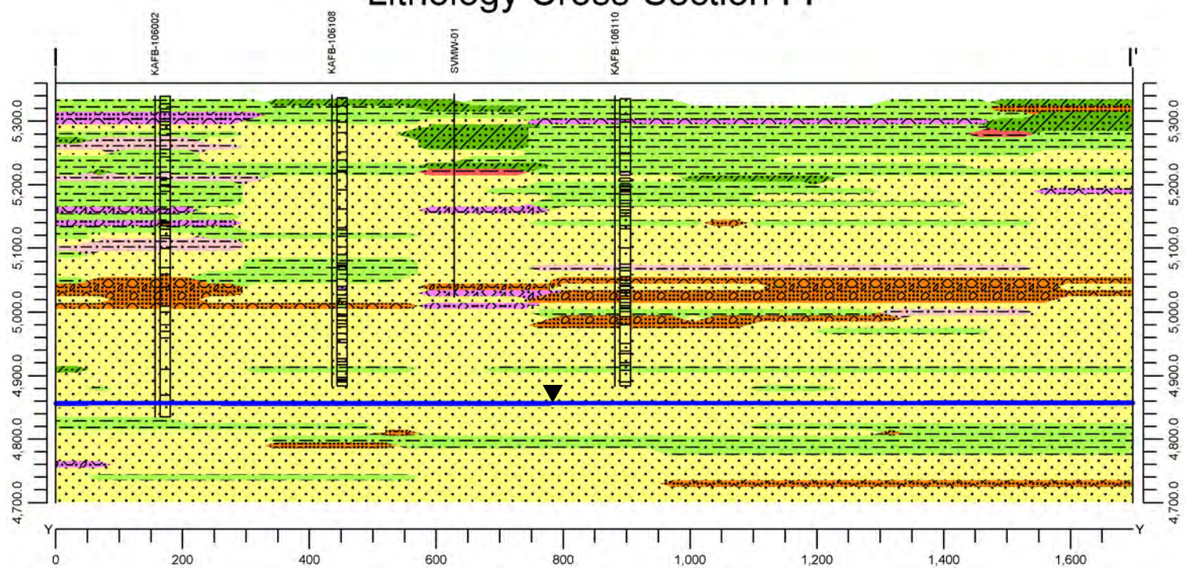
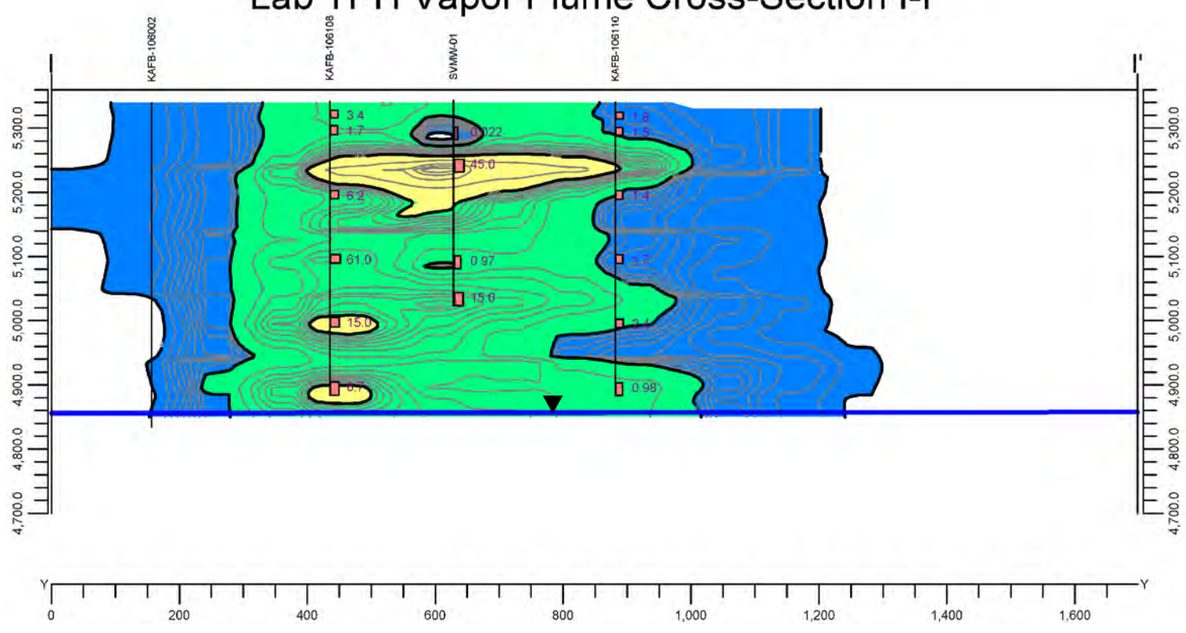
Lithology Cross-Section I-I'



Lab TPH Vapor Plume Cross-Section I-I'



Lithology Index

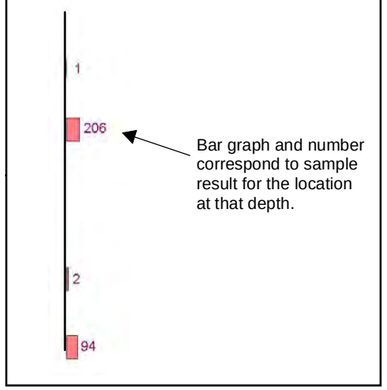
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

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FIGURE 4-8

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS I-I'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_078_VOC_vapor_cross_section_II.mxd 03/16/12

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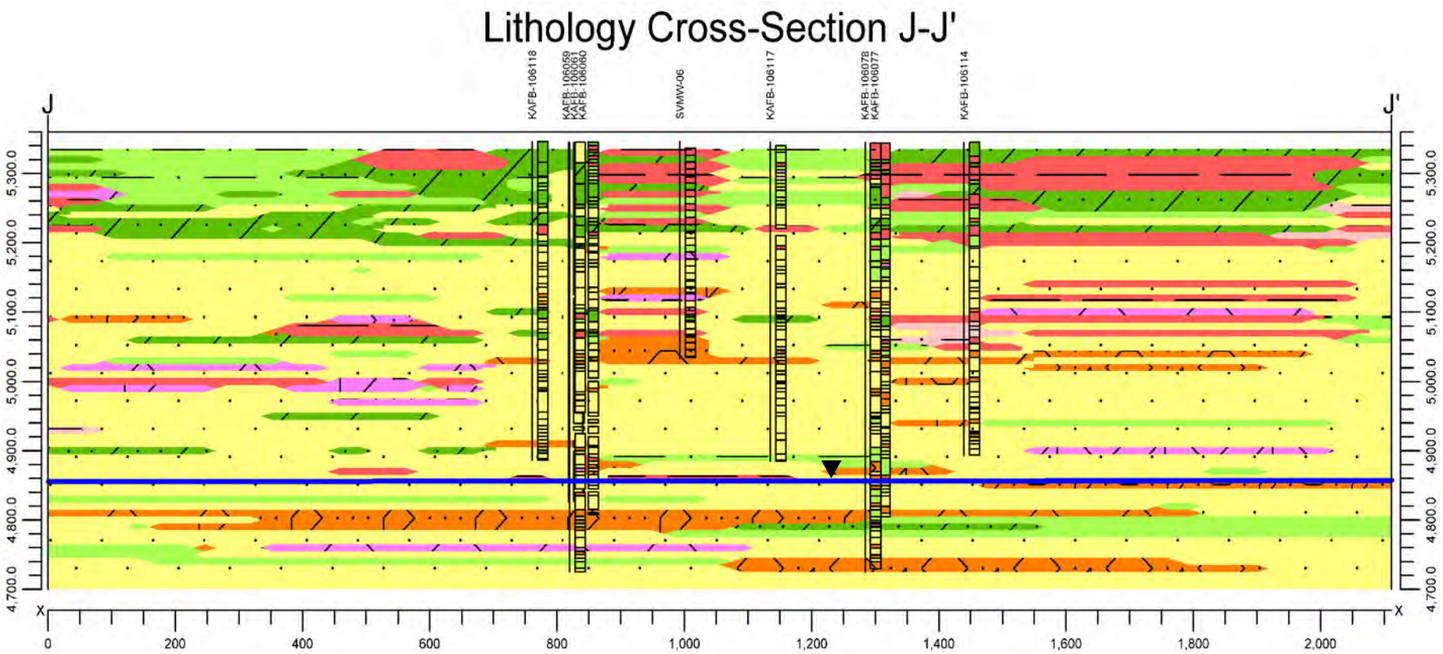
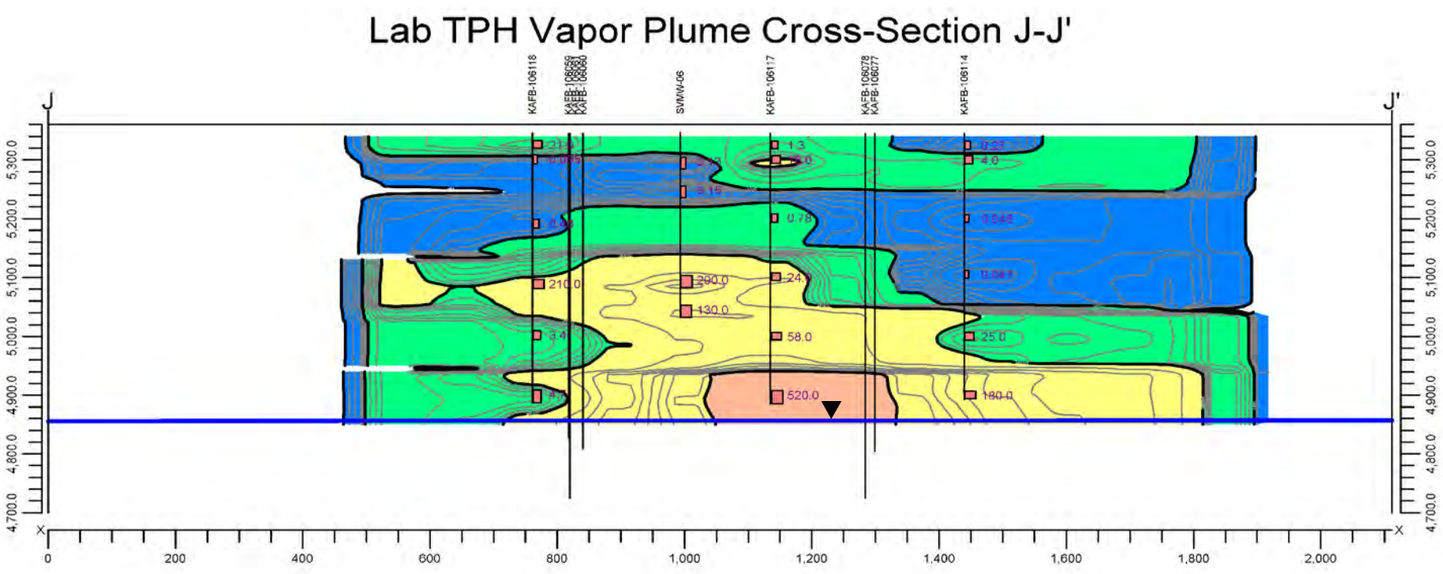




Lithology Index

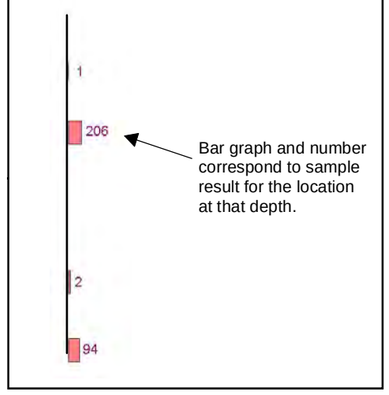
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

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FIGURE 4-9

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS J-J'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_079_VOC_vapor_cross_section_JJ.mxd 03/16/12

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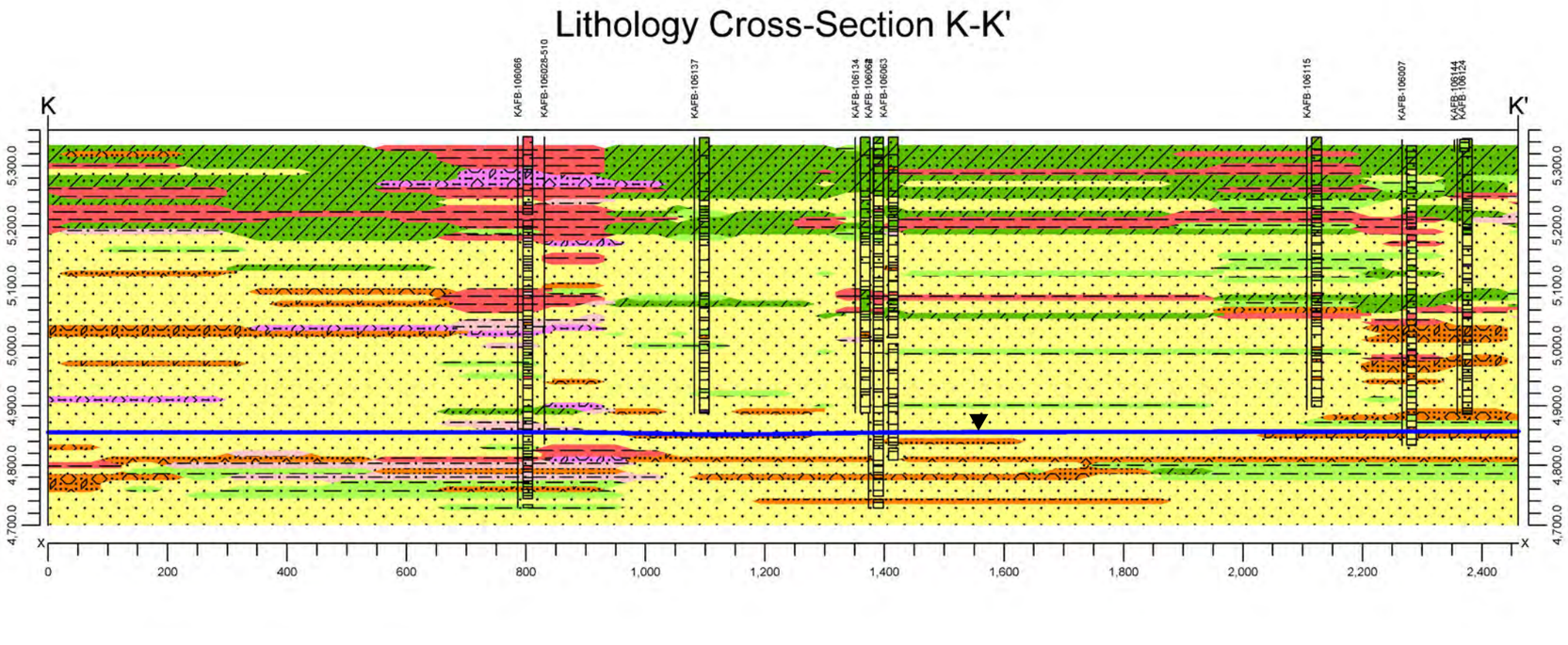
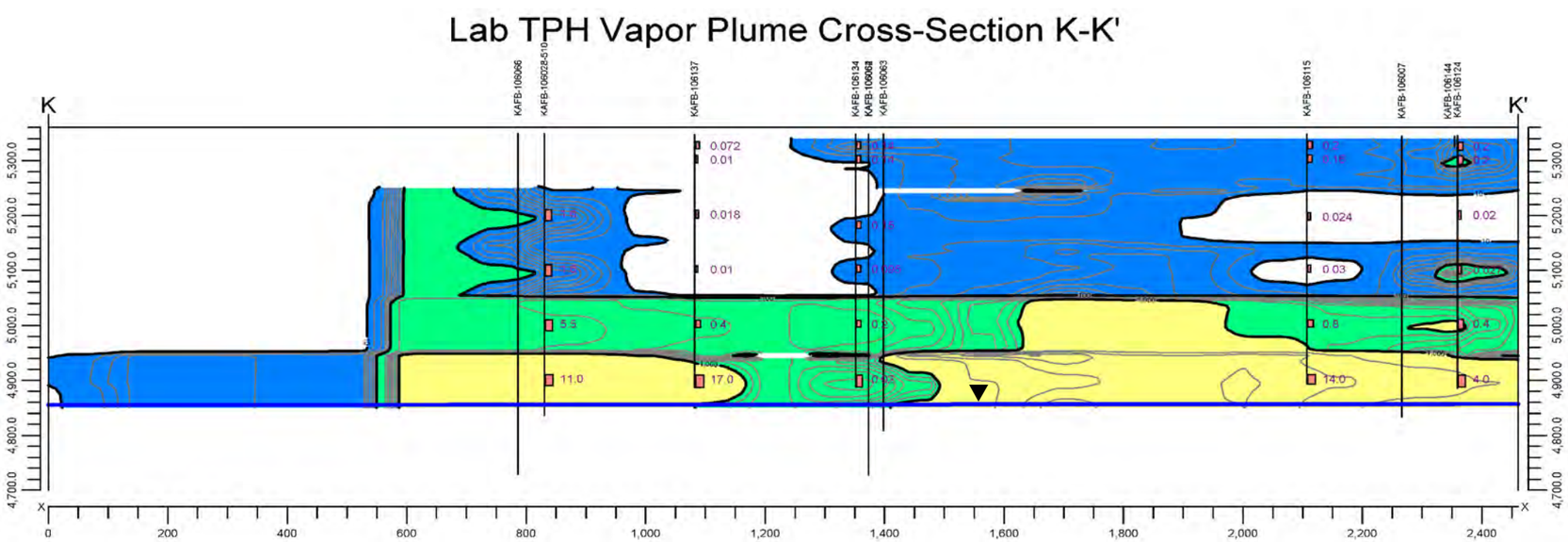




Lithology Index

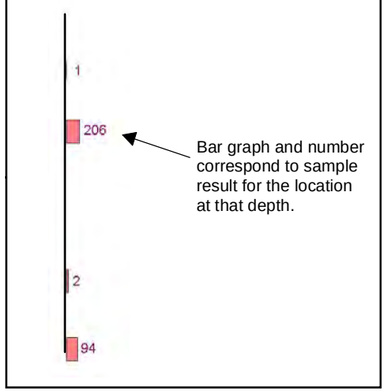
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Lab TPH Vapor Concentration (ppmv)

- 0.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0
- 1,000.0 - 10,000.0
- 10,000.0 - 100,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-3 for cross-section location map.

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FIGURE 4-10

LITHOLOGY AND TOTAL VOC VAPOR CROSS-SECTIONS K-K'

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_080_VOC_vapor_cross_section_KK.mxd 03/16/12

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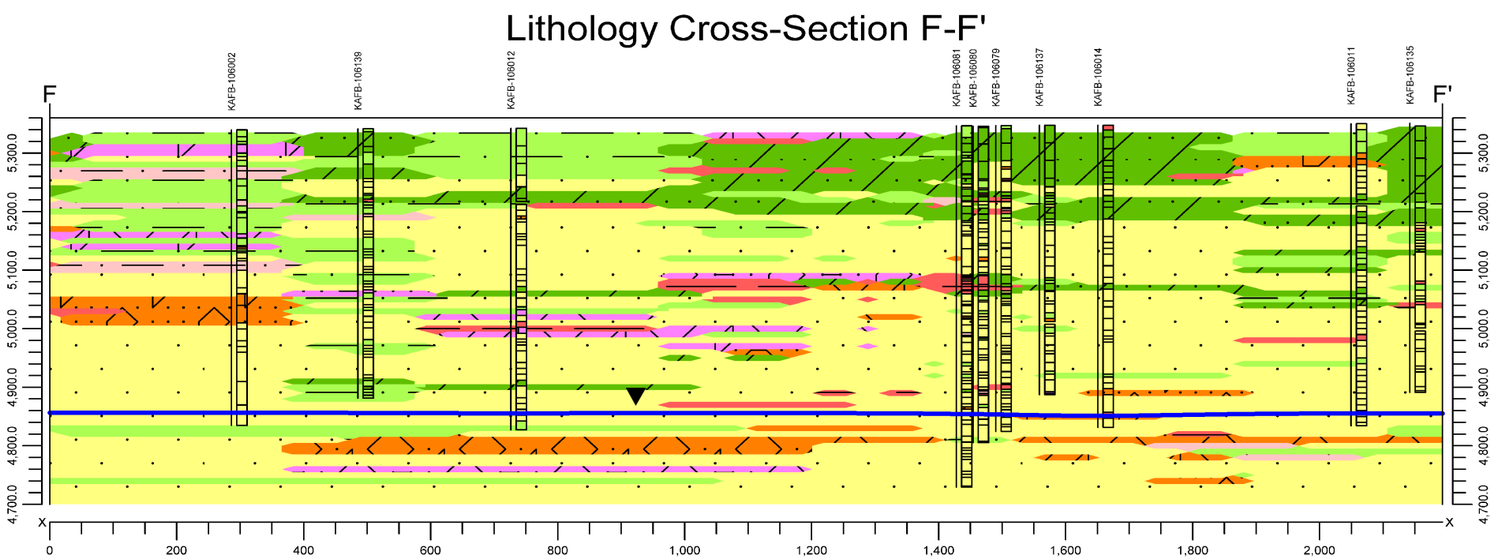
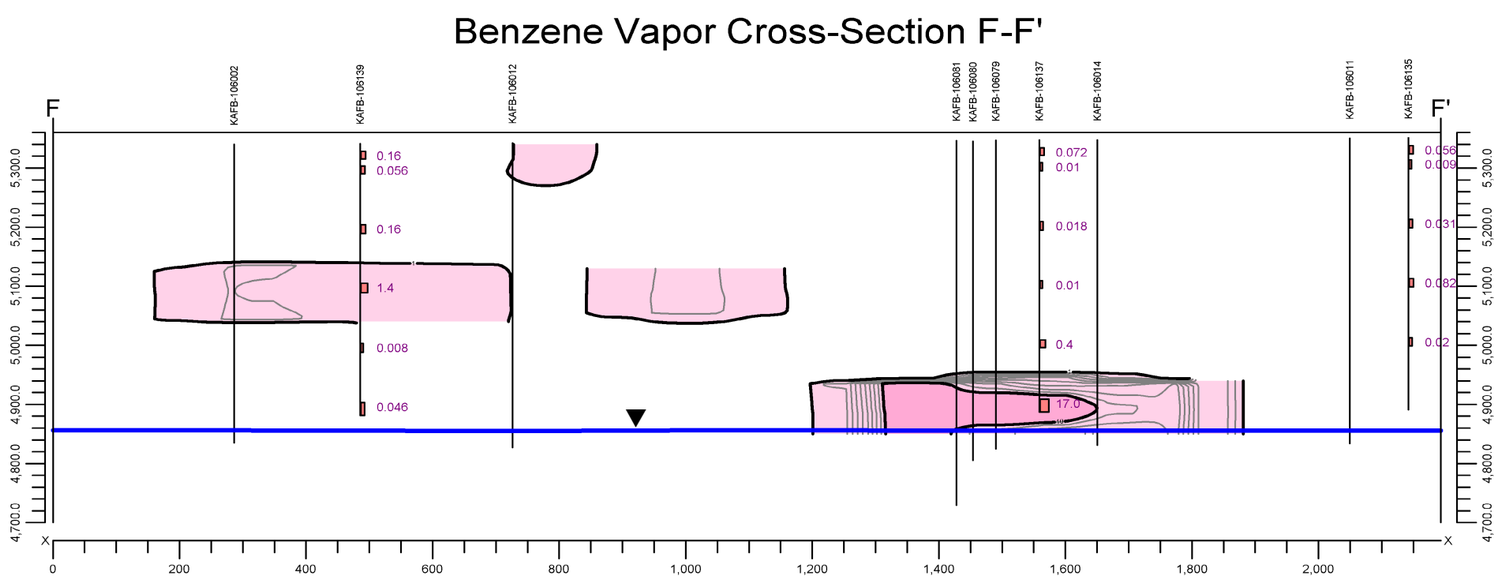




Lithology Index

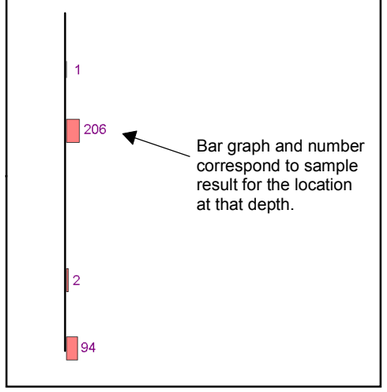
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-11

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS F-F'

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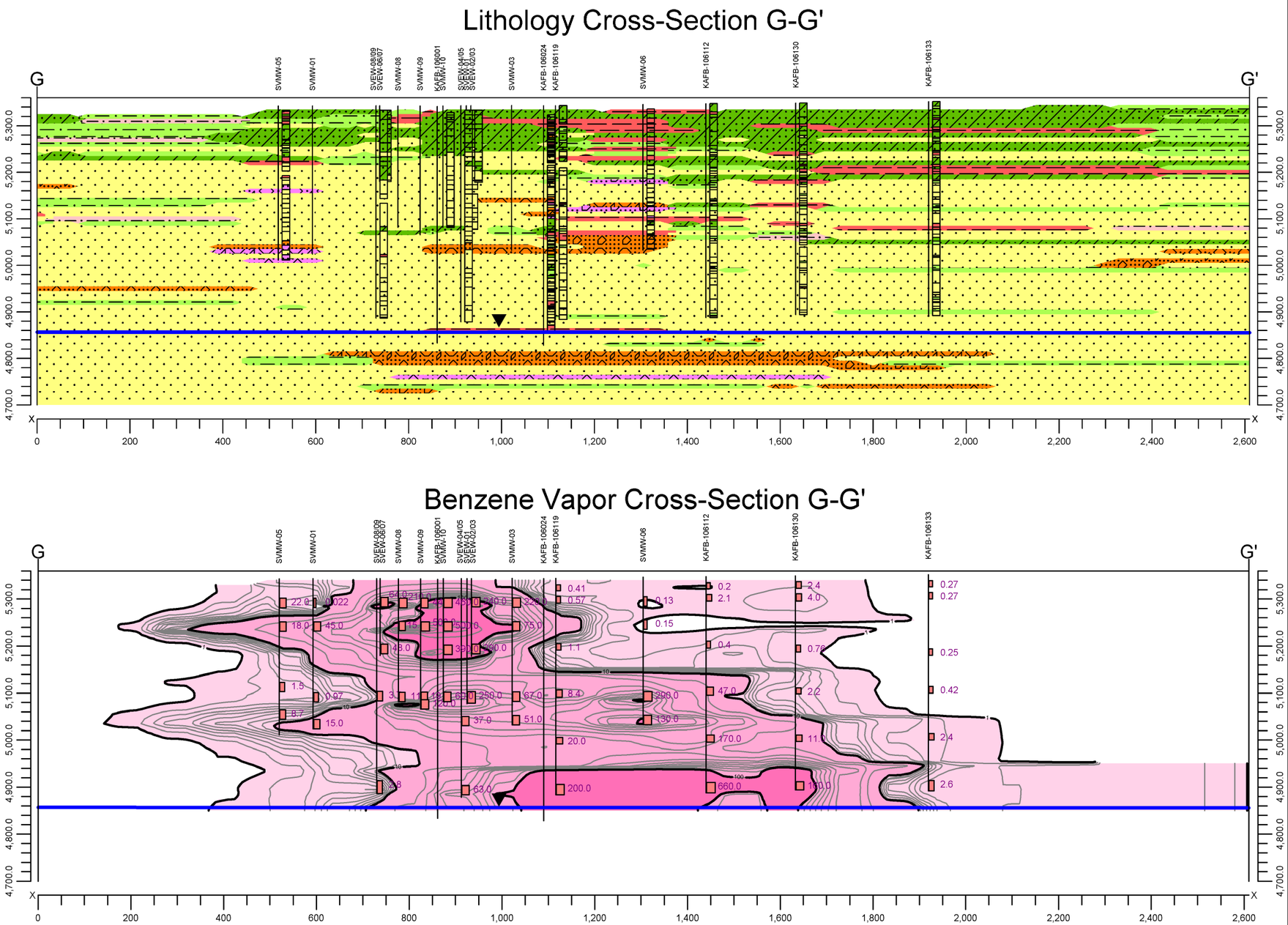


Lithology Index

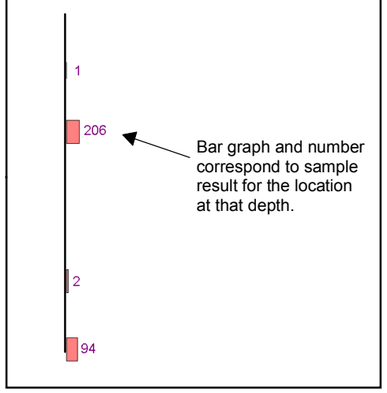
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-12

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS G-G'

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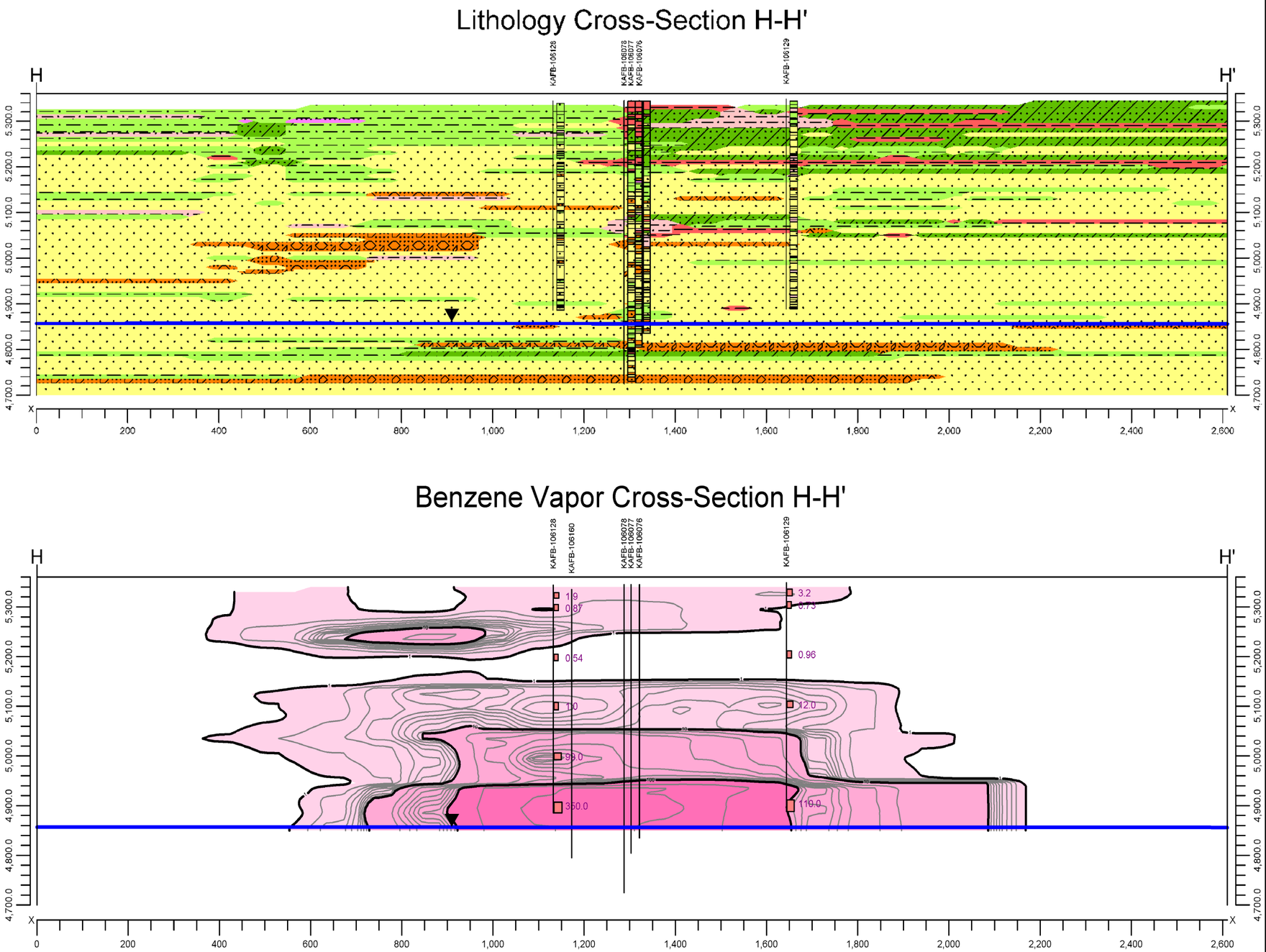


Lithology Index

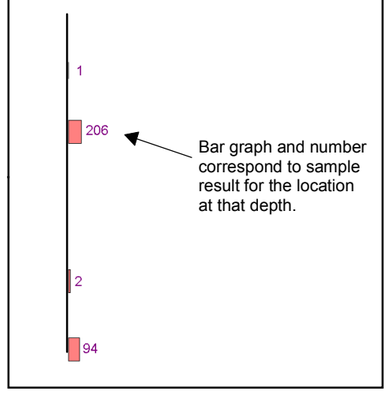
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-13

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS H-H'

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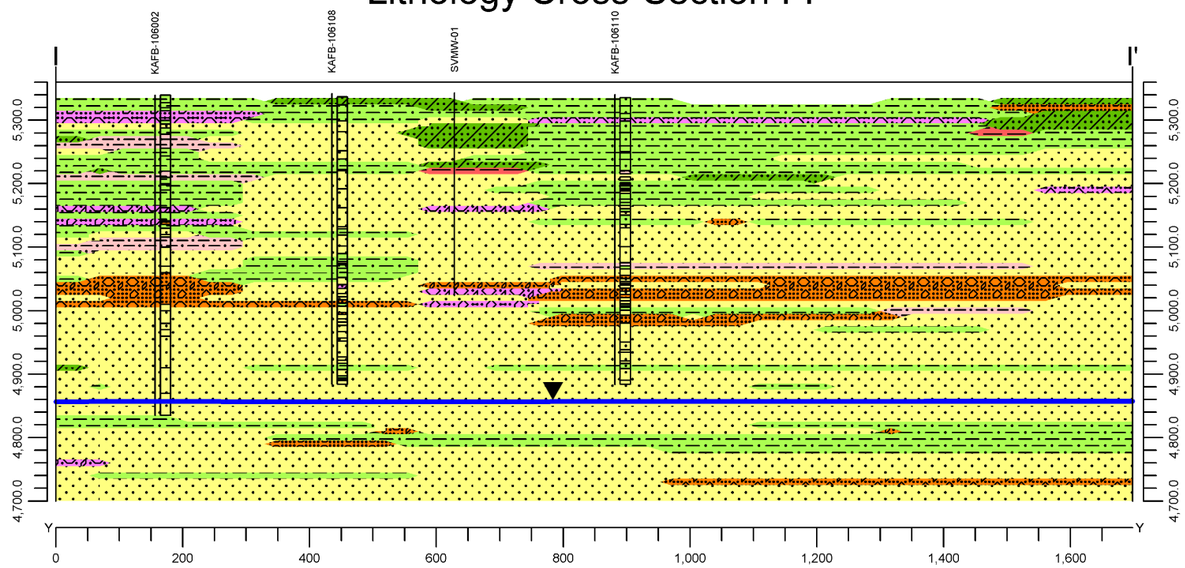
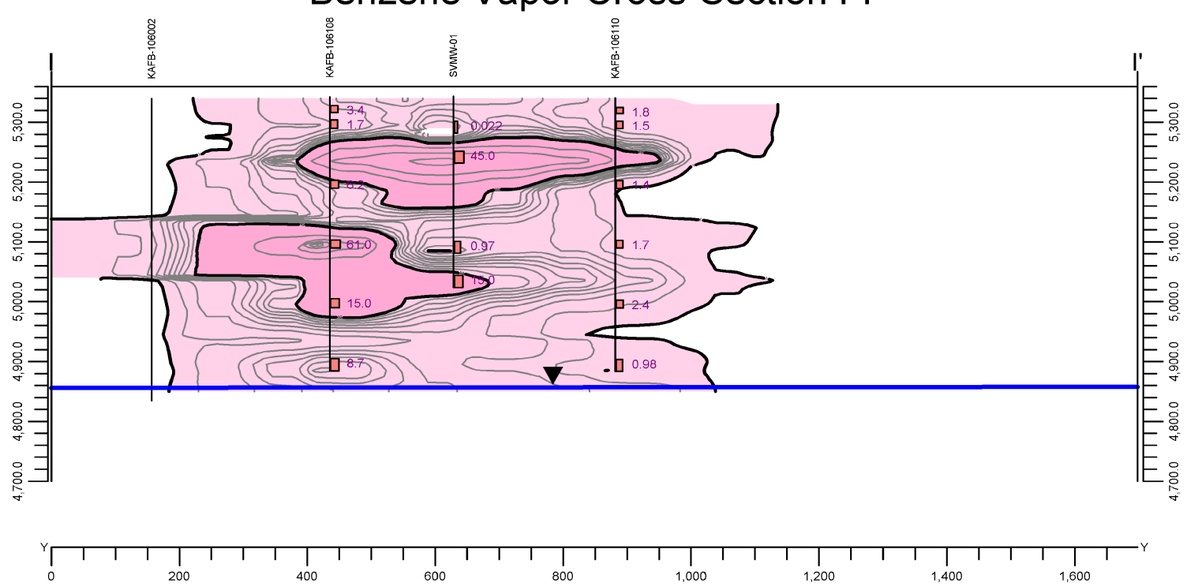
Lithology Cross-Section I-I'



Benzene Vapor Cross-Section I-I'



Lithology Index

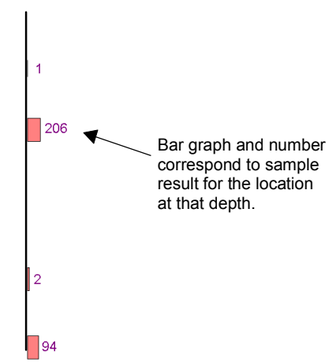
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Bar graph and number correspond to sample result for the location at that depth.

Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-14

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS I-I'

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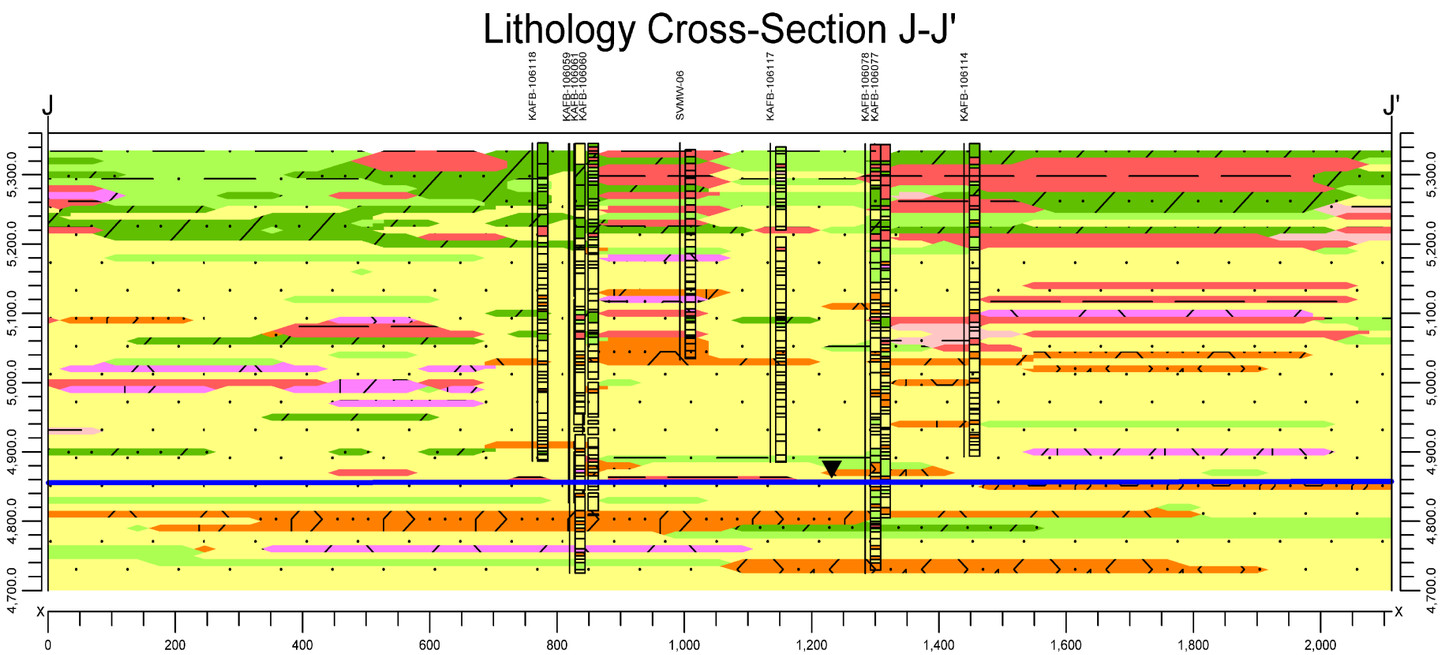
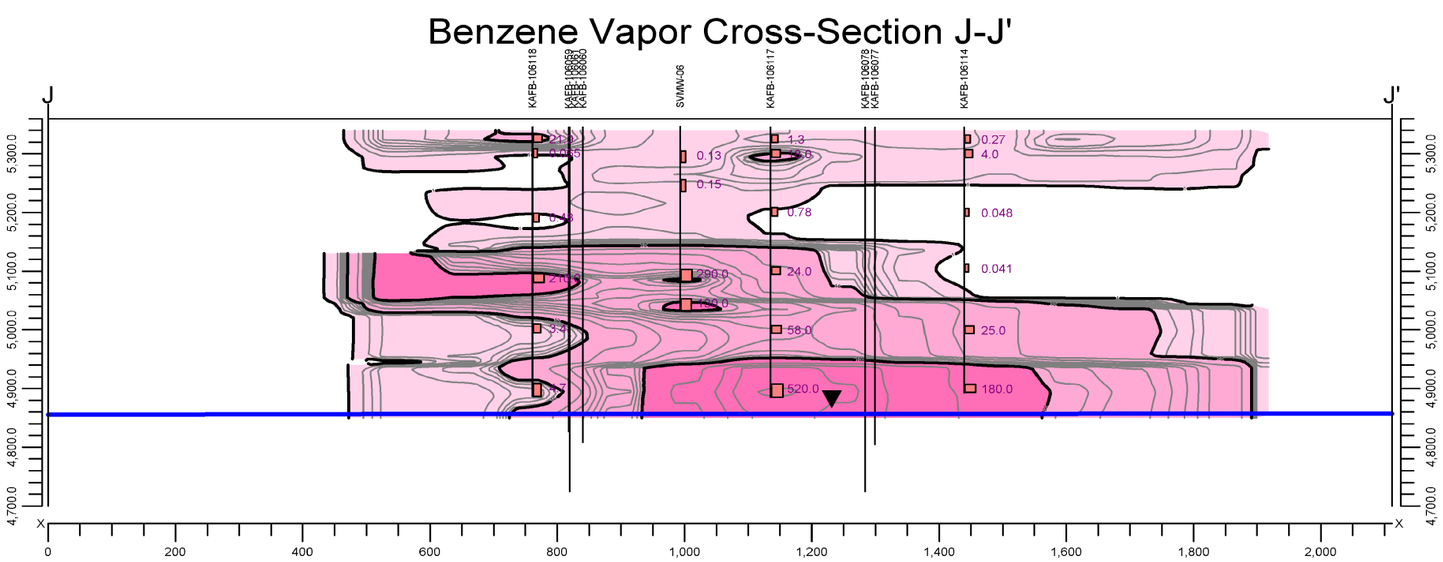




Lithology Index

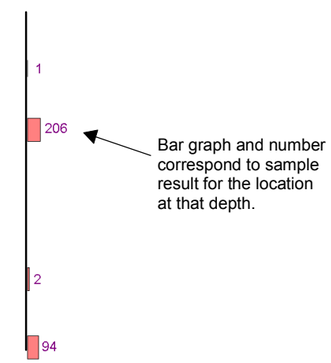
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-15

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS J-J'

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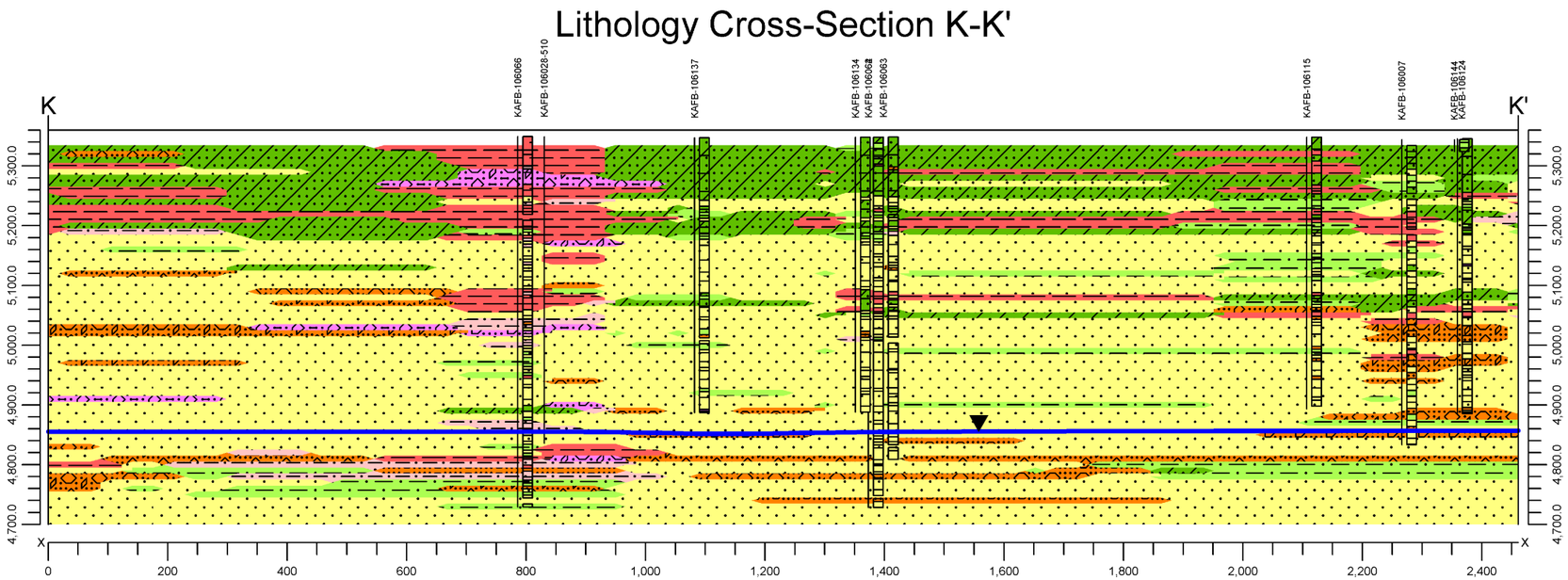
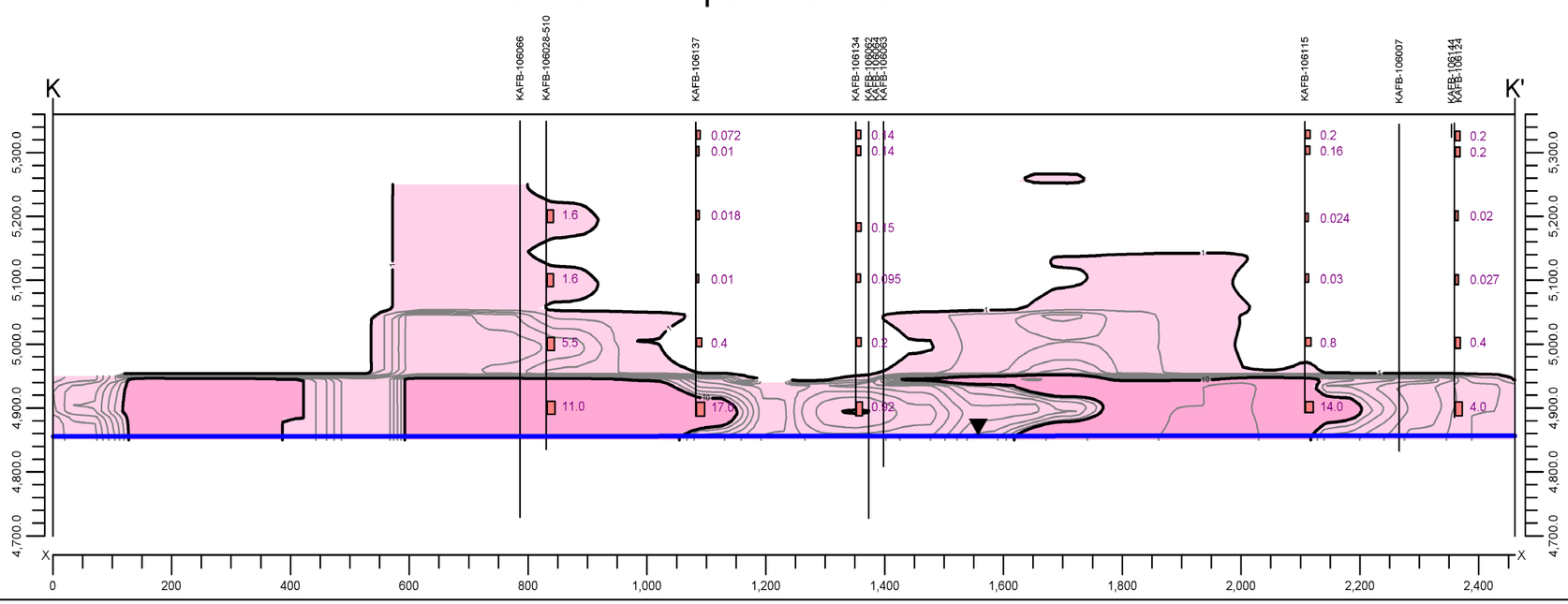




Lithology Index

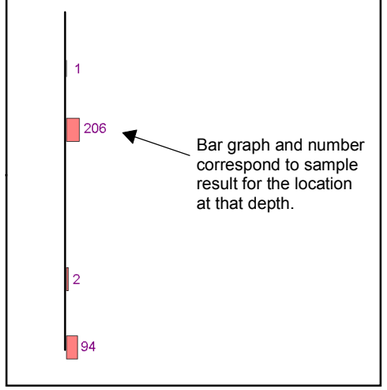
- Clay
- Clayey sand
- Gravel
- Sand
- Silt
- Silty Gravel
- Silty Sand

Benzene Vapor Concentration (ppmv)

- 1.0 - 10.0
- 10.0 - 100.0
- 100.0 - 1,000.0

Water Table

Borehole Detail



Note: No vertical exaggeration.
See Figure 4-4 for cross-section location map.

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FIGURE 4-16

LITHOLOGY AND BENZENE VAPOR CROSS-SECTIONS K-K'

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SECTION 5 FIGURES

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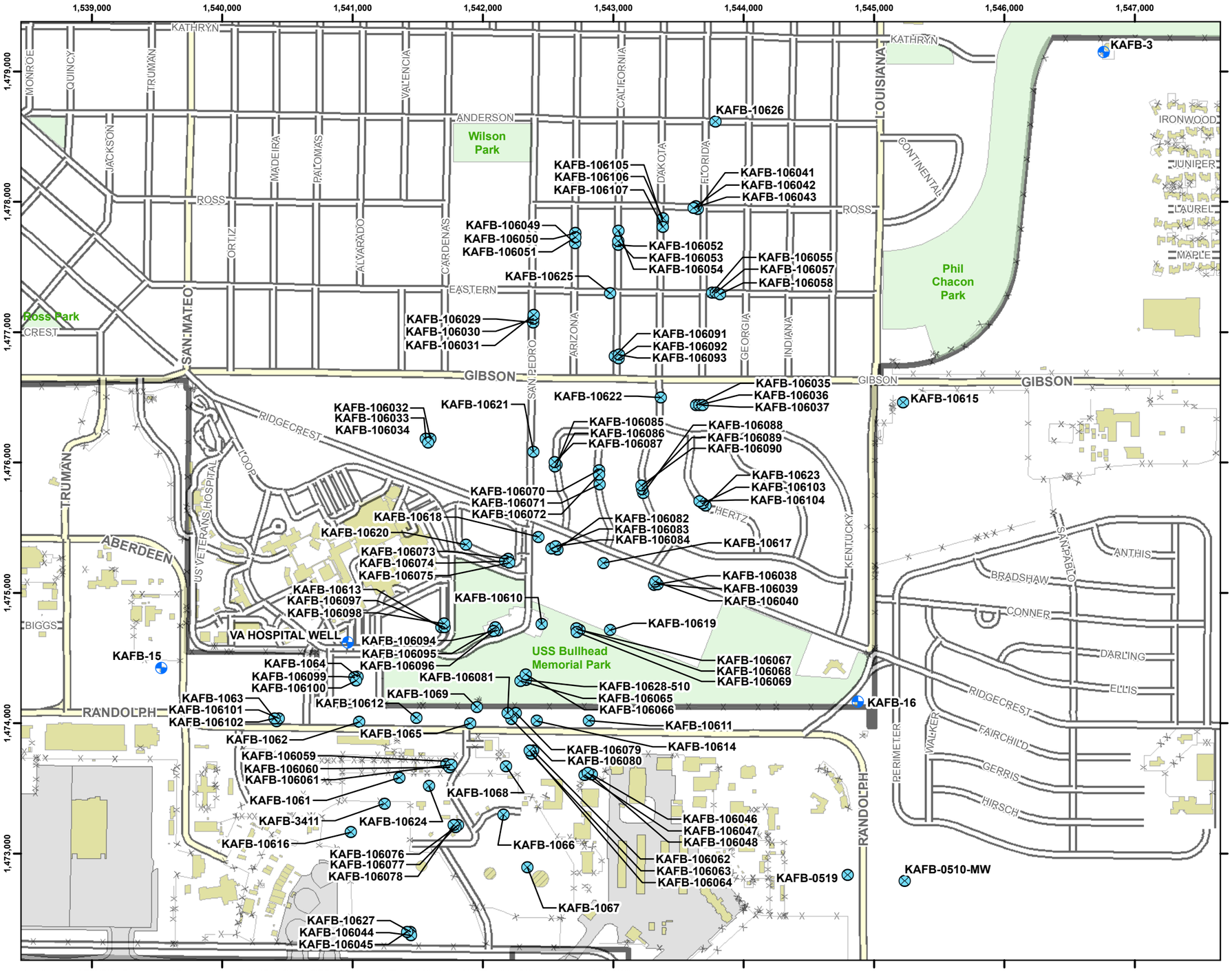
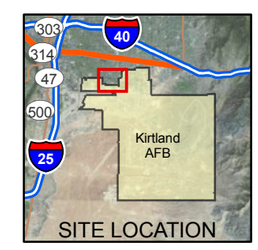


Legend

- Monitor Well
- Water Supply Well
- Fence
- Interstate
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary



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0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-1

MONITORING WELL LOCATIONS

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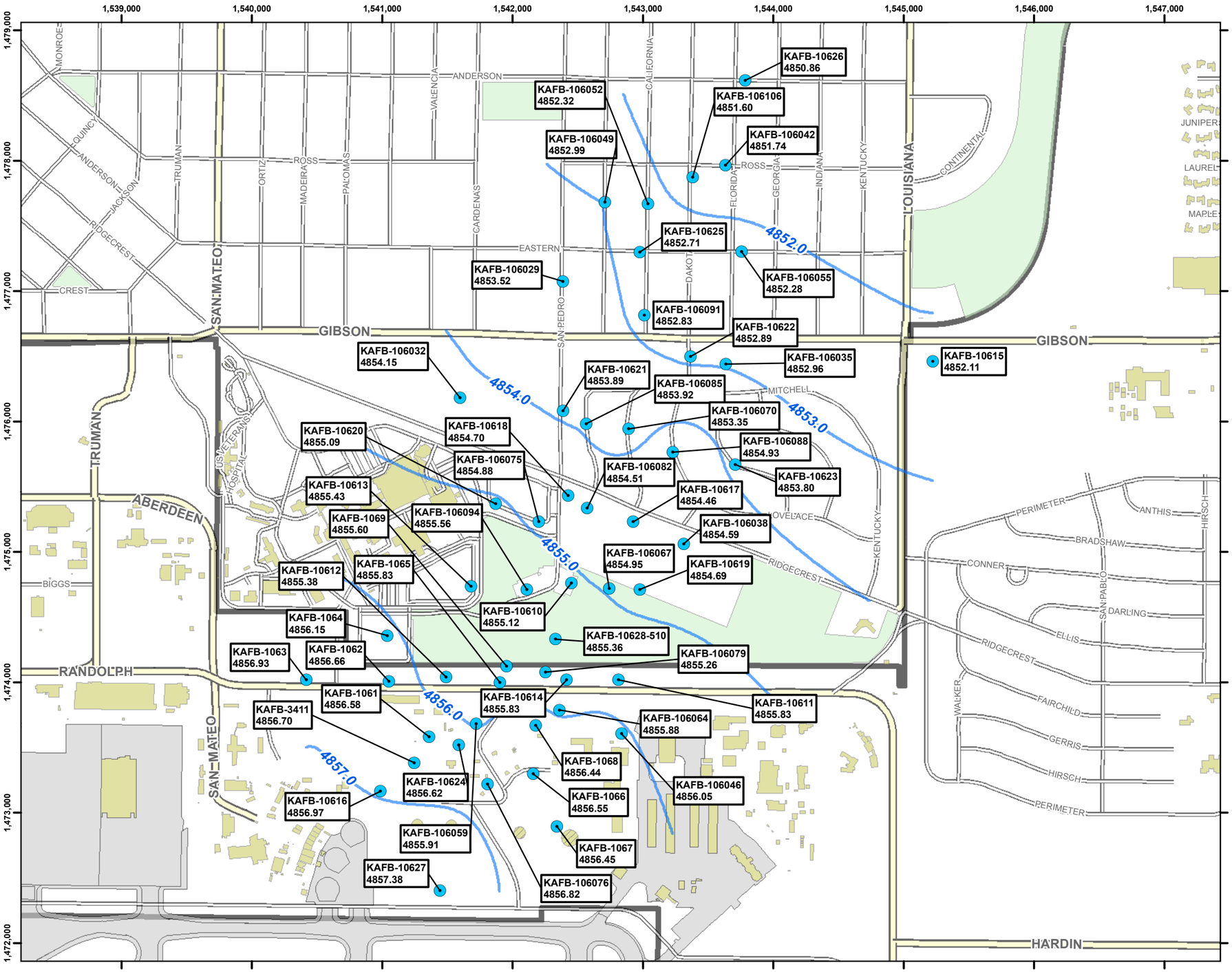
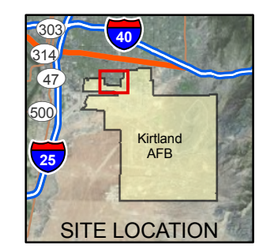


Legend

- Monitor Well With October 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 6100 ft using a spherical variogram and a nugget of zero.



N

Revision Date: 02/13/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-2

SHALLOW GROUNDWATER CONTOURS CORRECTED FOR NAPL THICKNESS OCTOBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_004_SWL_Contour_Shallow_2011_Oct.mxd 02/13/12

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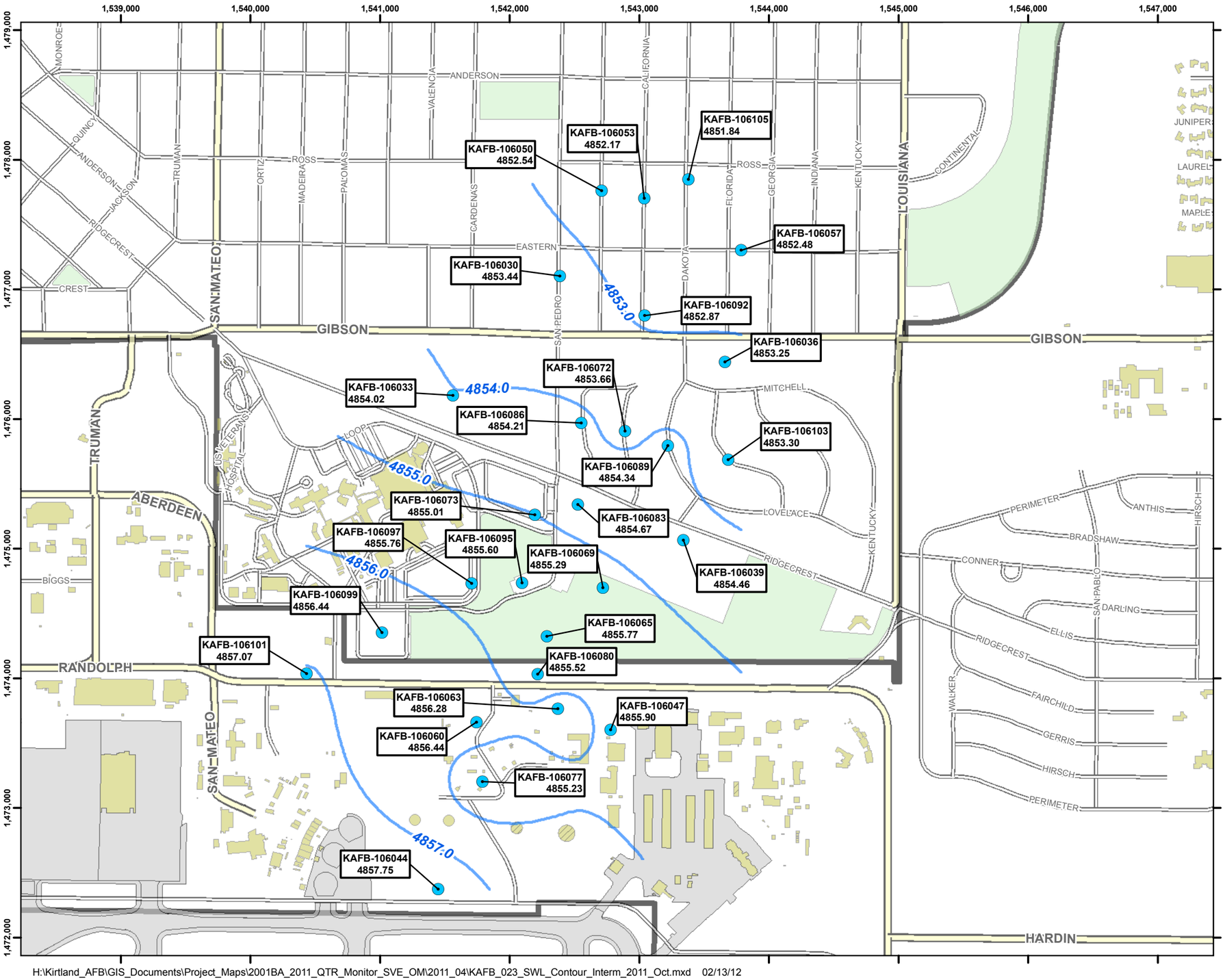
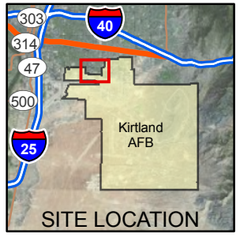


Legend

- Monitor Well With October 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5400 ft using a spherical variogram and a nugget of zero.



Revision Date: 02/13/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-3

INTERMEDIATE GROUNDWATER CONTOURS, CORRECTED FOR NAPL THICKNESS, OCTOBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_023_SWL_Contour_Interm_2011_Oct.mxd 02/13/12

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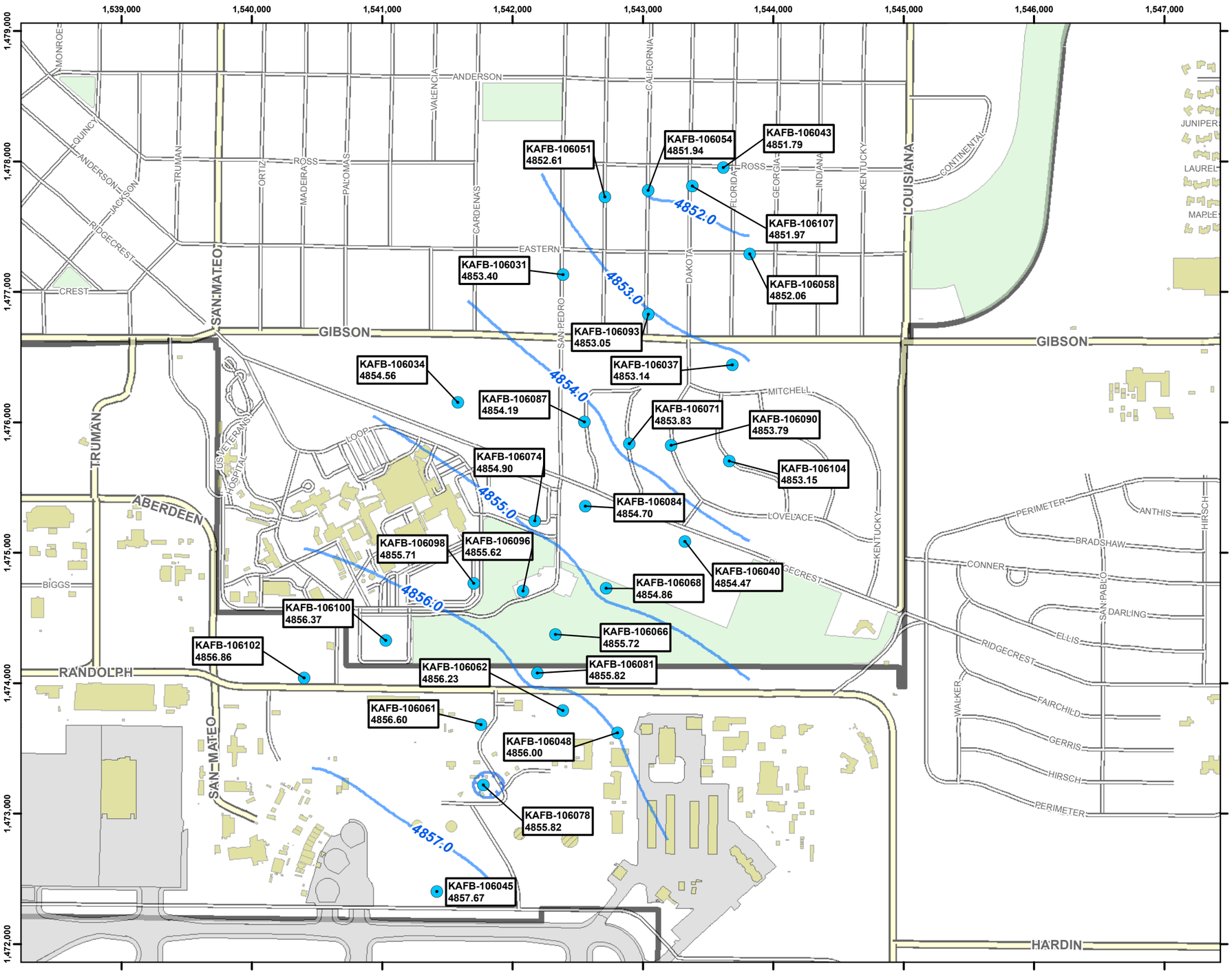
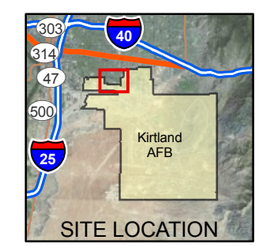


Legend

- Monitor Well With October 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Groundwater Depression
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5500 ft using a spherical variogram and a nugget of zero.



N

Revision Date: 02/13/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
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FIGURE 5-4

DEEP GROUNDWATER CONTOURS
CORRECTED FOR NAPL THICKNESS
OCTOBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_024_SWL_Contour_Deep_2011_Oct.mxd 02/13/12

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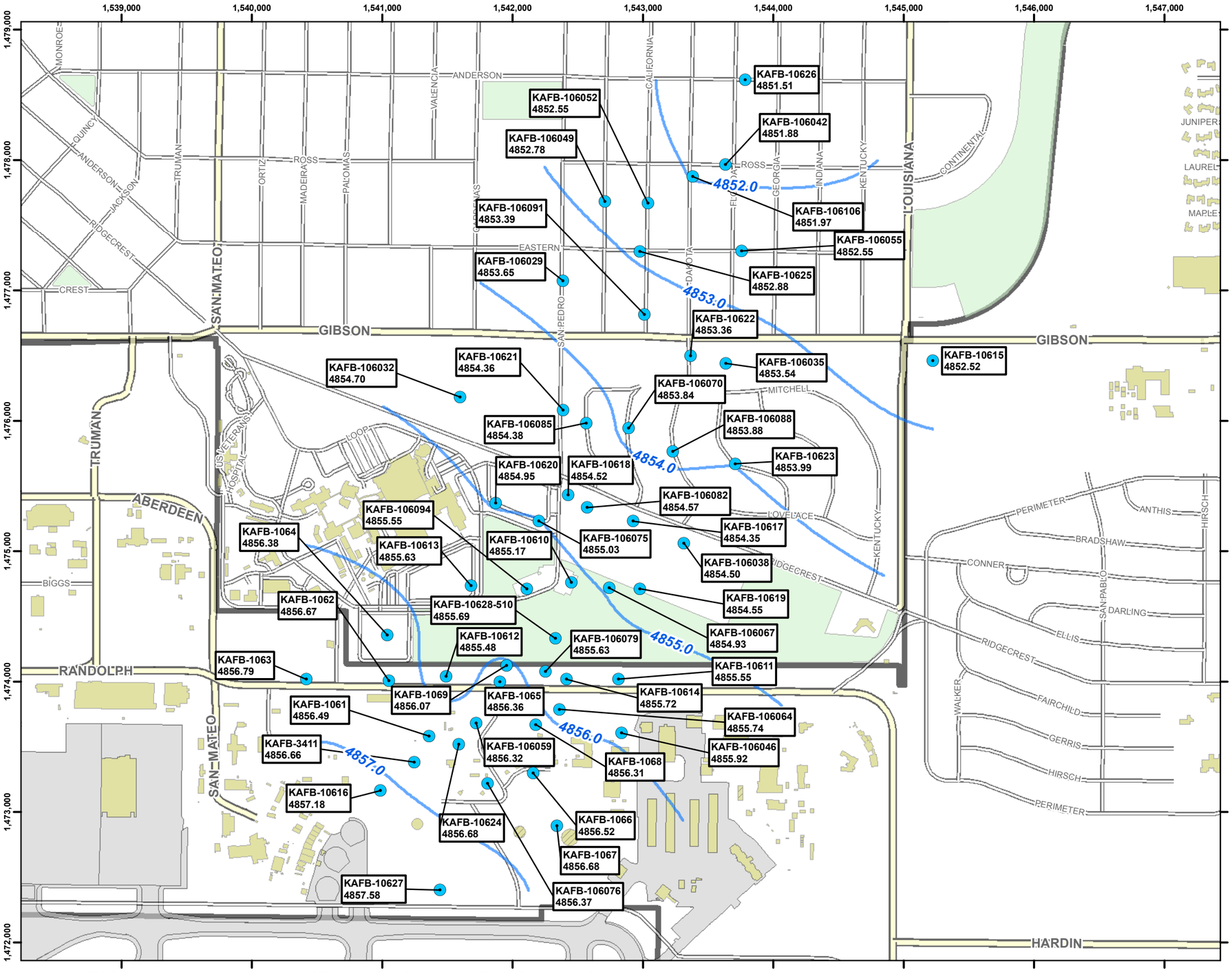
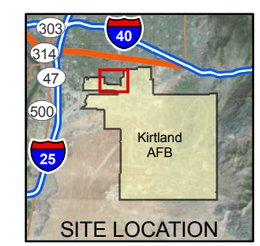


Legend

- Monitor Well With November 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 6100 ft using a spherical variogram and a nugget of zero.



Revision Date: 02/13/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
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FIGURE 5-5

SHALLOW GROUNDWATER CONTOURS CORRECTED FOR NAPL THICKNESS NOVEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_025_SWL_Contour_Shallow_2011_Nov.mxd 02/13/12

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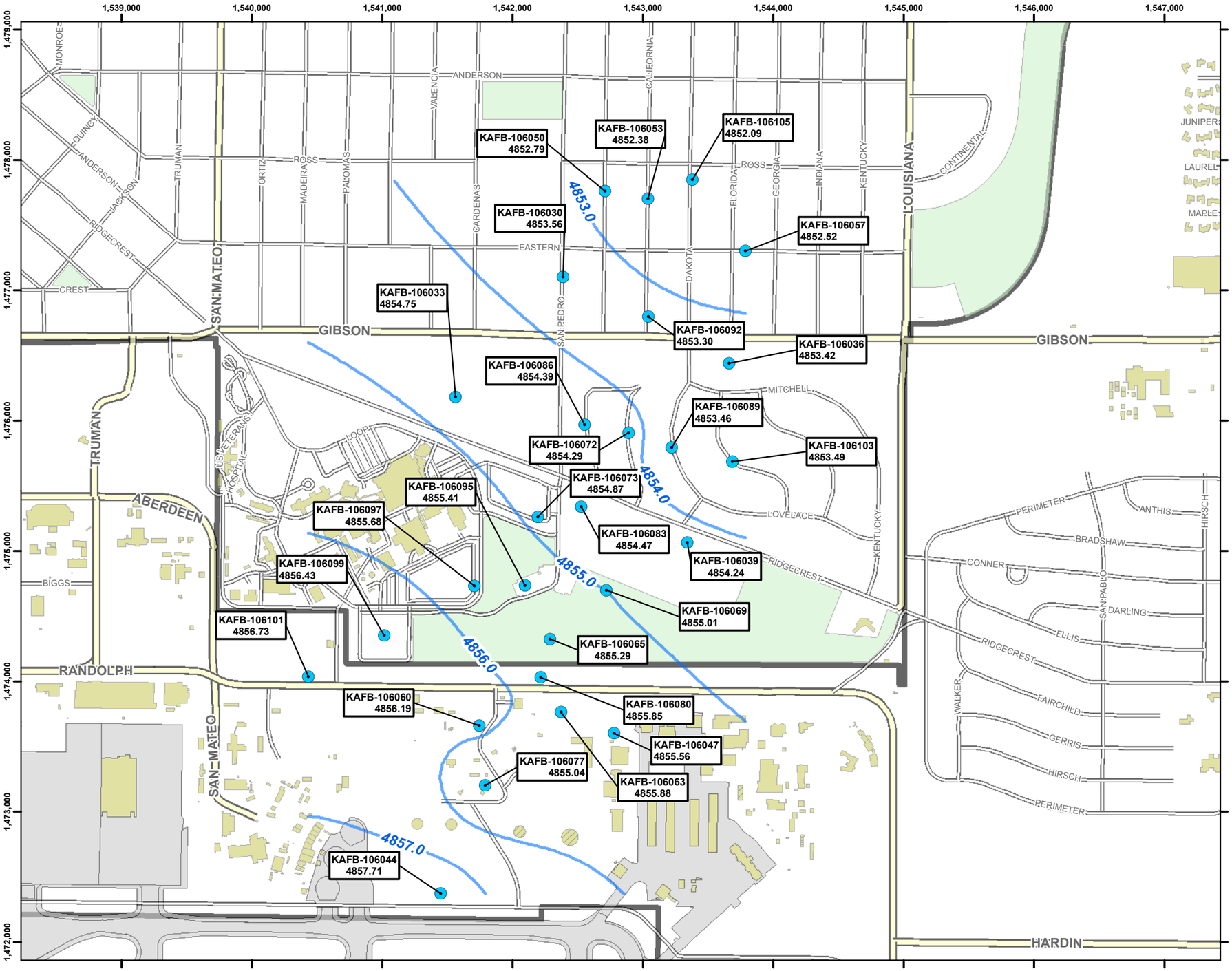
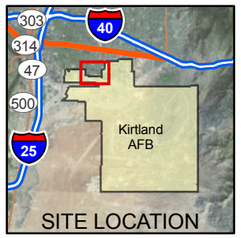


Legend

- Monitor Well With November 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5400 ft using a spherical variogram and a nugget of zero.



Revision Date: 02/13/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-6

INTERMEDIATE GROUNDWATER CONTOURS, CORRECTED FOR NAPL THICKNESS, NOVEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_026_SWL_Contour_Interm_2011_Nov.mxd 02/13/12

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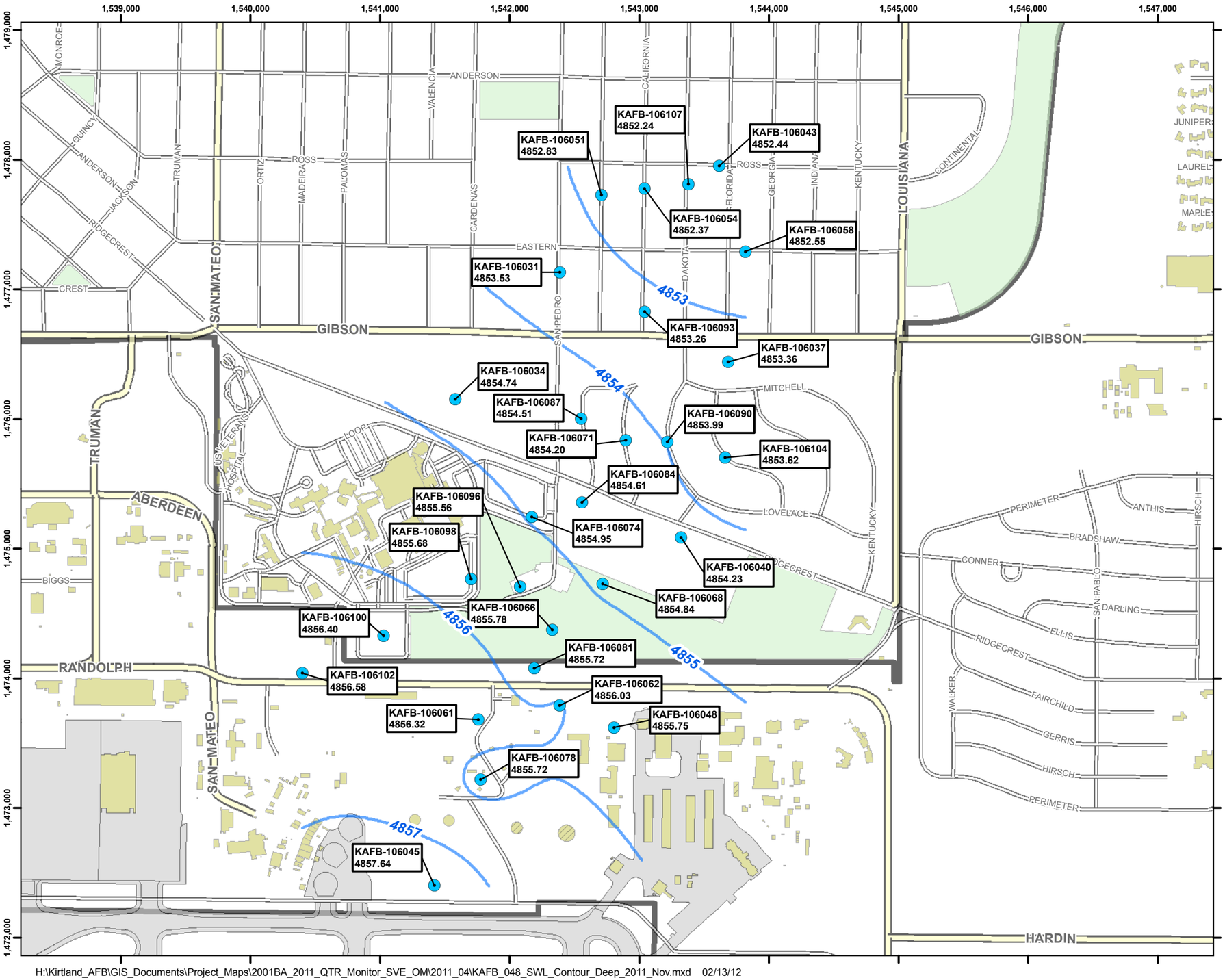
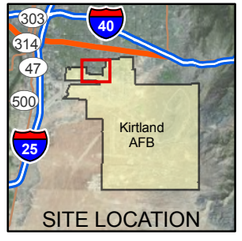


Legend

- Monitor Well With November 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5500 ft using a spherical variogram and a nugget of zero.



Revision Date: 02/13/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-7

DEEP GROUNDWATER CONTOURS CORRECTED FOR NAPL THICKNESS NOVEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_048_SWL_Contour_Deep_2011_Nov.mxd 02/13/12

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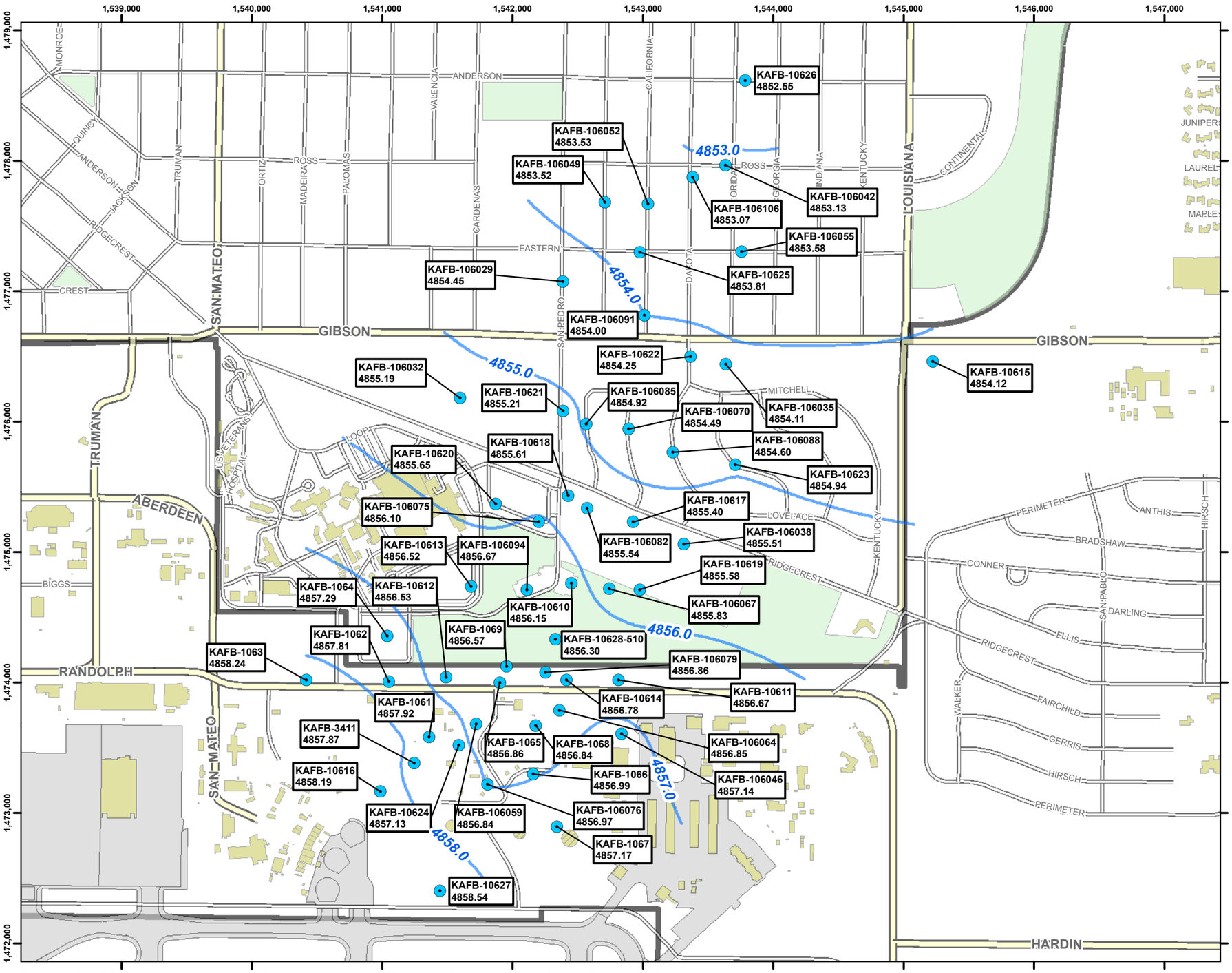
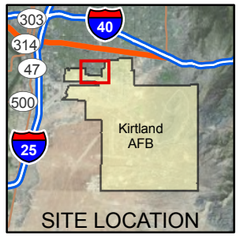


Legend

- Monitor Well With December 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 6100 ft using a spherical variogram and a nugget of zero.



N

Revision Date: 02/13/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-8

SHALLOW GROUNDWATER CONTOURS CORRECTED FOR NAPL THICKNESS DECEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_049_SWL_Contour_Shallow_2011_Dec.mxd 02/13/12

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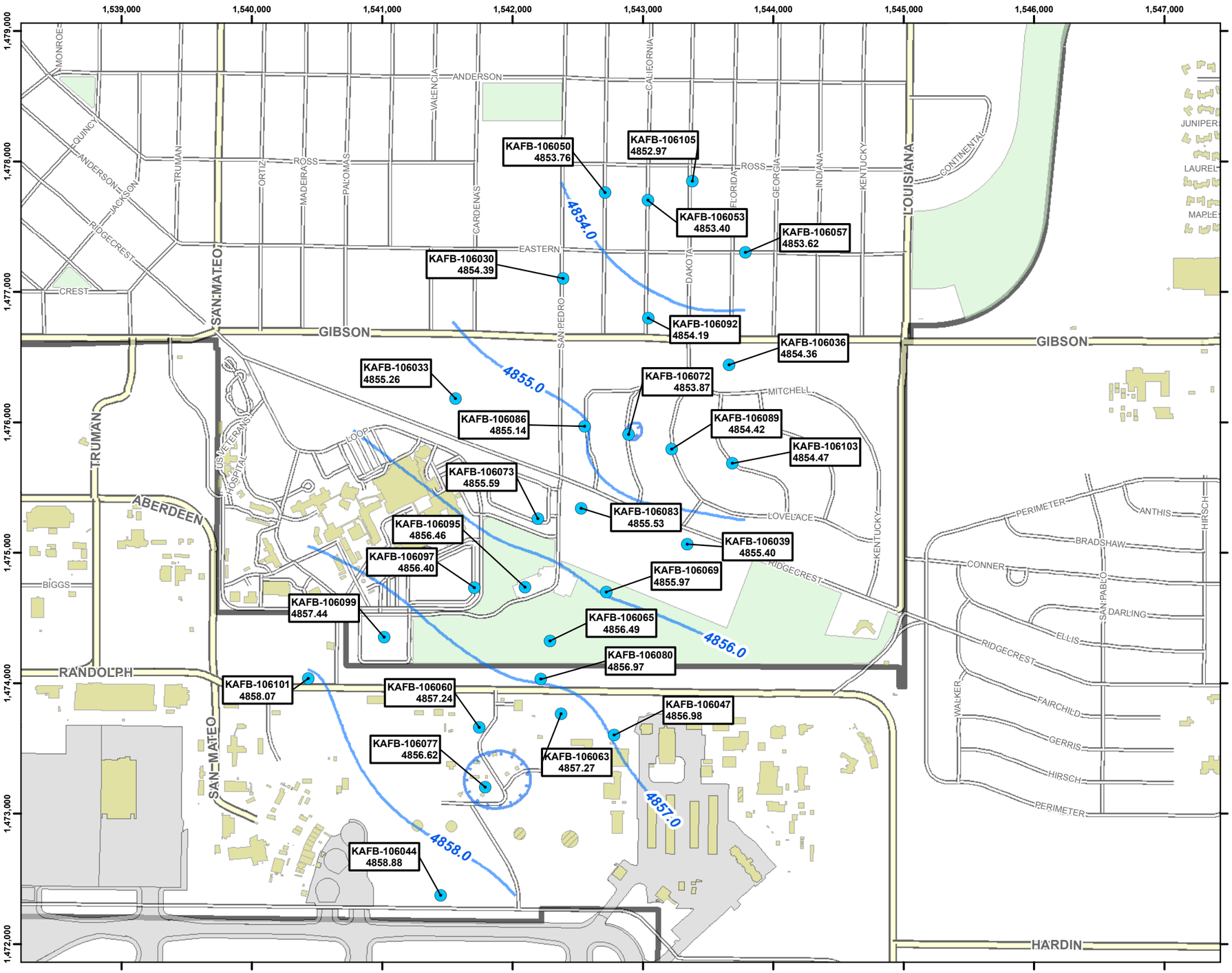

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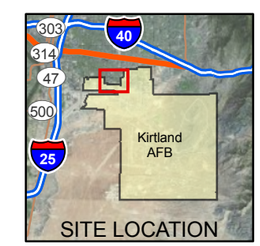
Legend

- Monitor Well With December 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Groundwater Depression
- Major Road
- Road
- Existing Structure
- Runway
- Previously Existing Structure
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5400 ft using a spherical variogram and a nugget of zero.



N

Revision Date: 02/13/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-9

INTERMEDIATE GROUNDWATER CONTOURS, CORRECTED FOR NAPL THICKNESS, DECEMBER 2011

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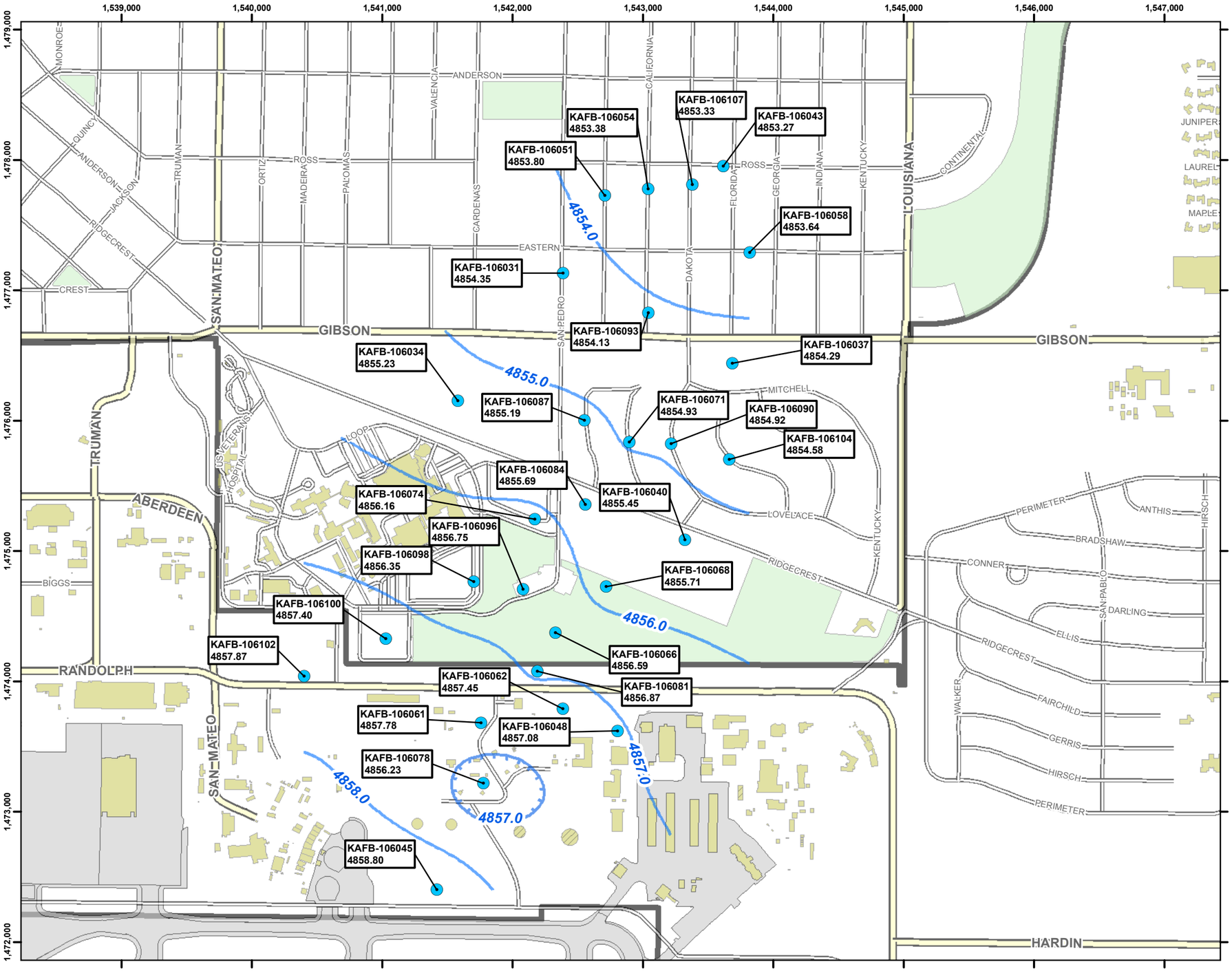
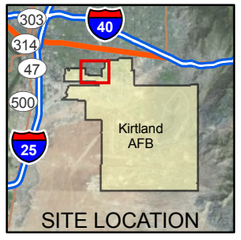


Legend

- Monitor Well With December 2011 Groundwater Elevation
- Groundwater Level Contour (ft msl)
- Groundwater Depression
- Major Road
- Road
- Existing Structure
- Previously Existing Structure
- Runway
- Park
- Installation Boundary

Note: Groundwater level contours were interpolated using ordinary kriging with a range of 5500 ft using a spherical variogram and a nugget of zero.



N

Revision Date: 02/13/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-10

DEEP GROUNDWATER CONTOURS CORRECTED FOR NAPL THICKNESS DECEMBER 2011

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_051_SWL_Contour_Deep_2011_Dec.mxd 02/13/12

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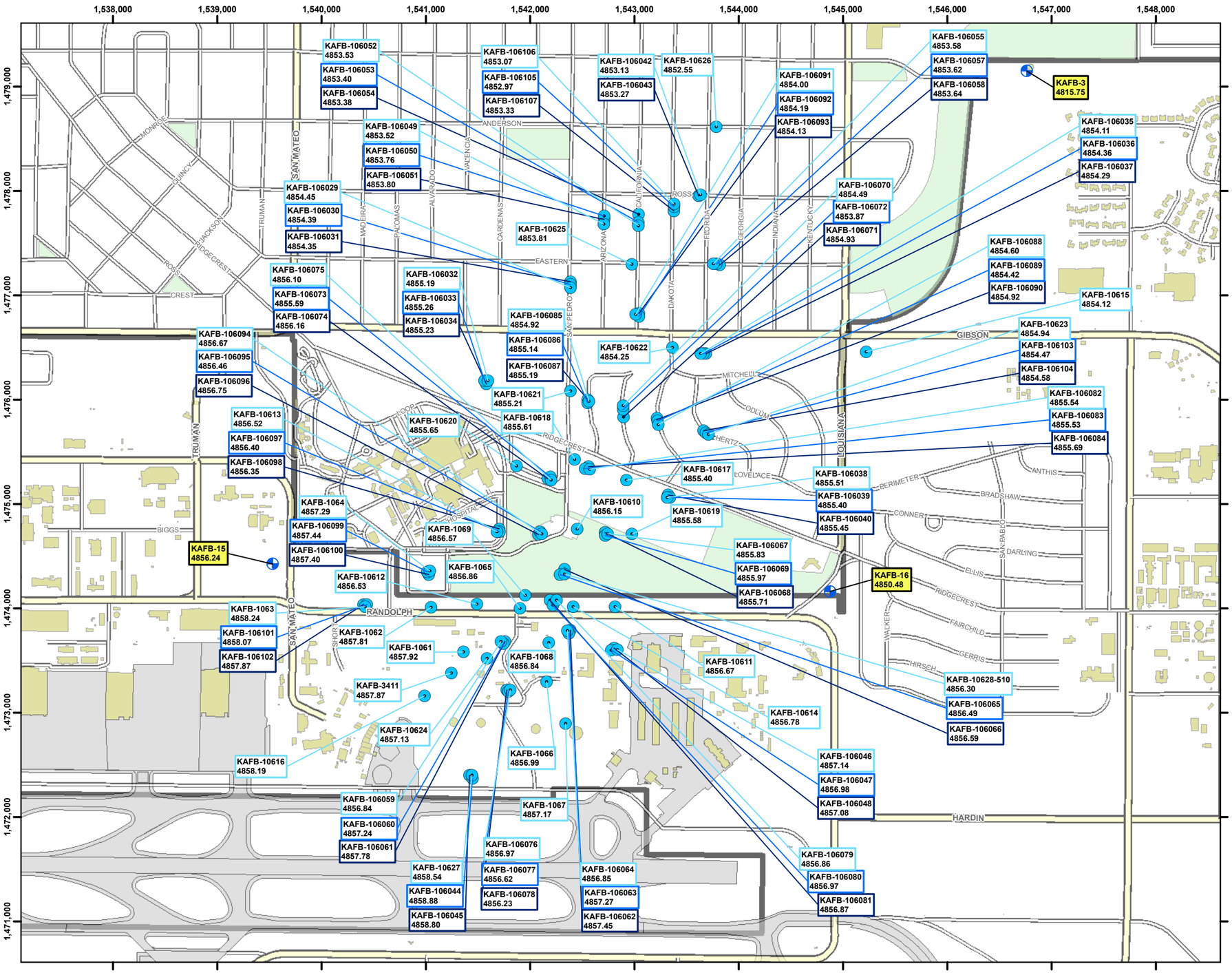


Legend

- Water Supply Well with August 2011 Static (Non-Pumping) Groundwater Elevation
- Monitor Well With December 2011 Groundwater Elevation
- Major Road
- Road
- Structure
- Runway
- Park
- Installation Boundary

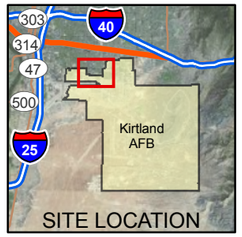
Well Screened in Shallow Zone of Aquifer

Well Screened in Intermediate Zone of Aquifer

Well Screened in Deep Zone of Aquifer

Water Supply Well

Note: Water supply well water elevations are from August, 2011.



N

Revision Date: 02/22/12

0 400 800 1,600

Feet

1 inch = 1,000 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-11

COMPREHENSIVE POSTING OF DECEMBER 2011 WATER LEVEL ELEVATIONS

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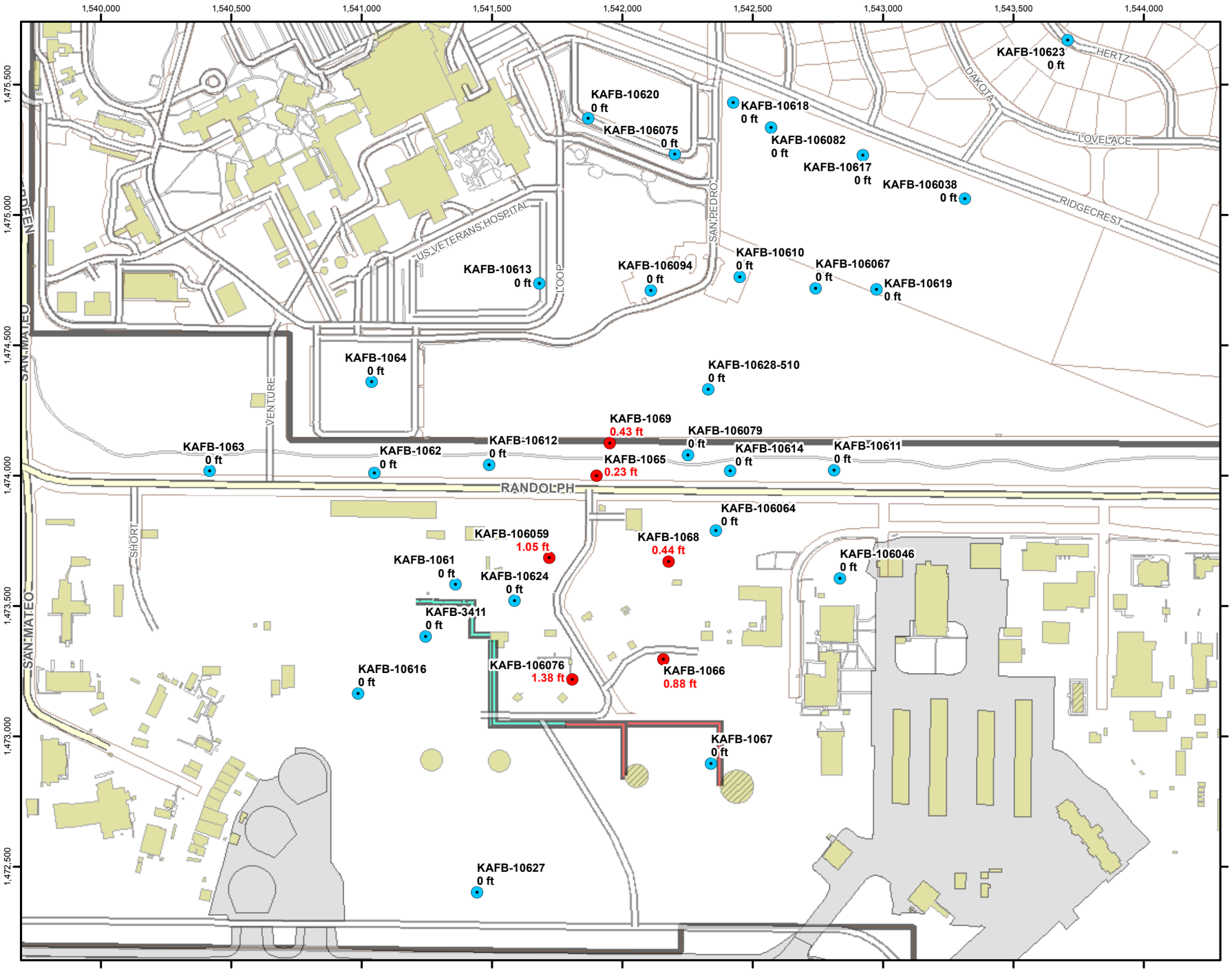
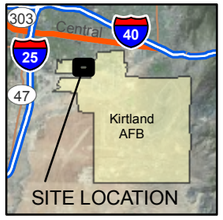


Legend

- Monitor Well With NAPL
- Monitor Well Without NAPL
- Interstate
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/21/12

N

0 200 400 800

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-12

NAPL THICKNESS
SHALLOW GROUNDWATER
OCTOBER 2011

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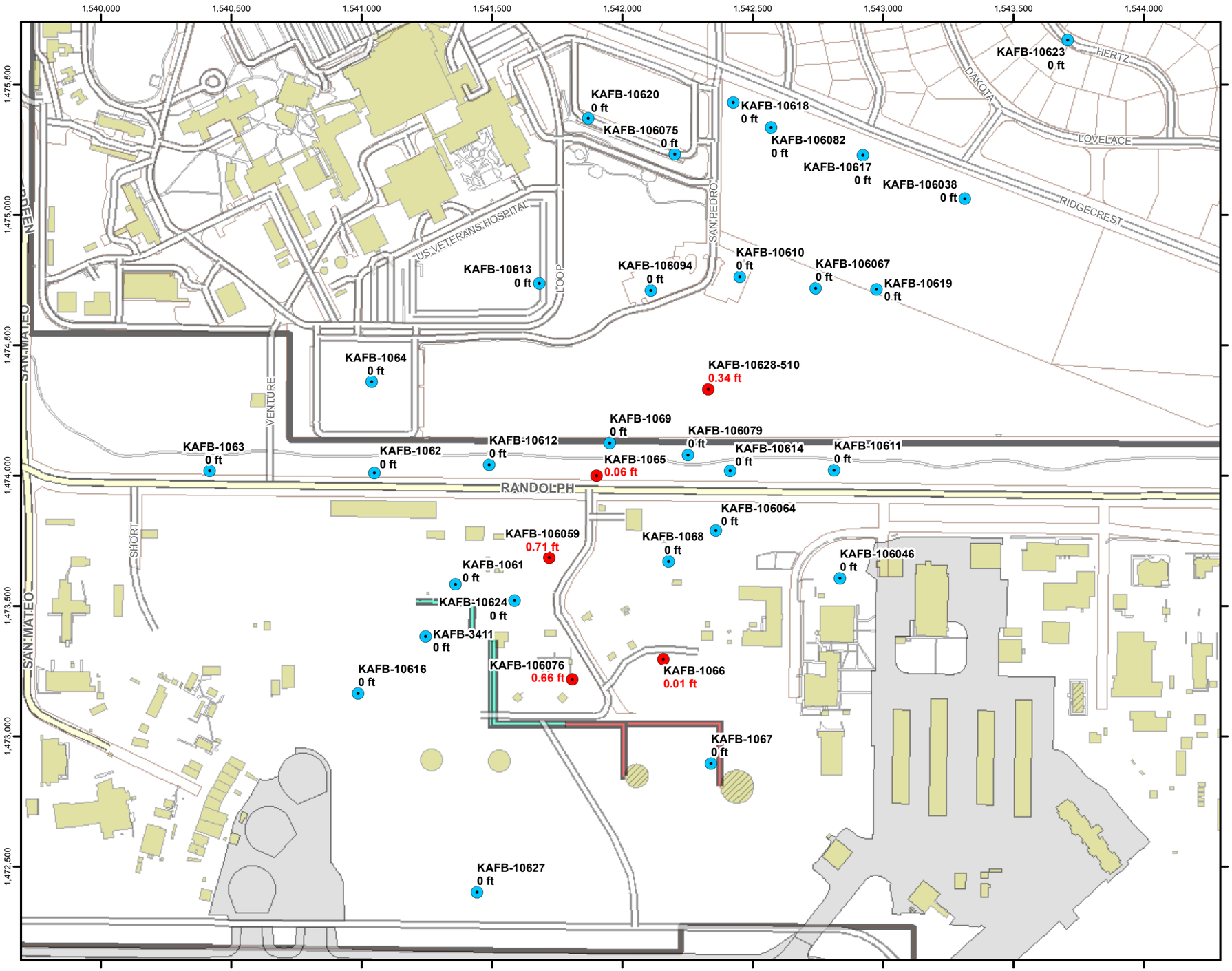
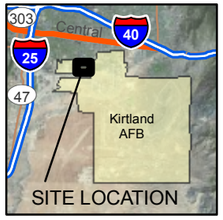


Legend

- Monitor Well With NAPL
- Monitor Well Without NAPL
- Interstate
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/21/12

N

0 200 400 800

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-13

NAPL THICKNESS
SHALLOW GROUNDWATER
NOVEMBER 2011

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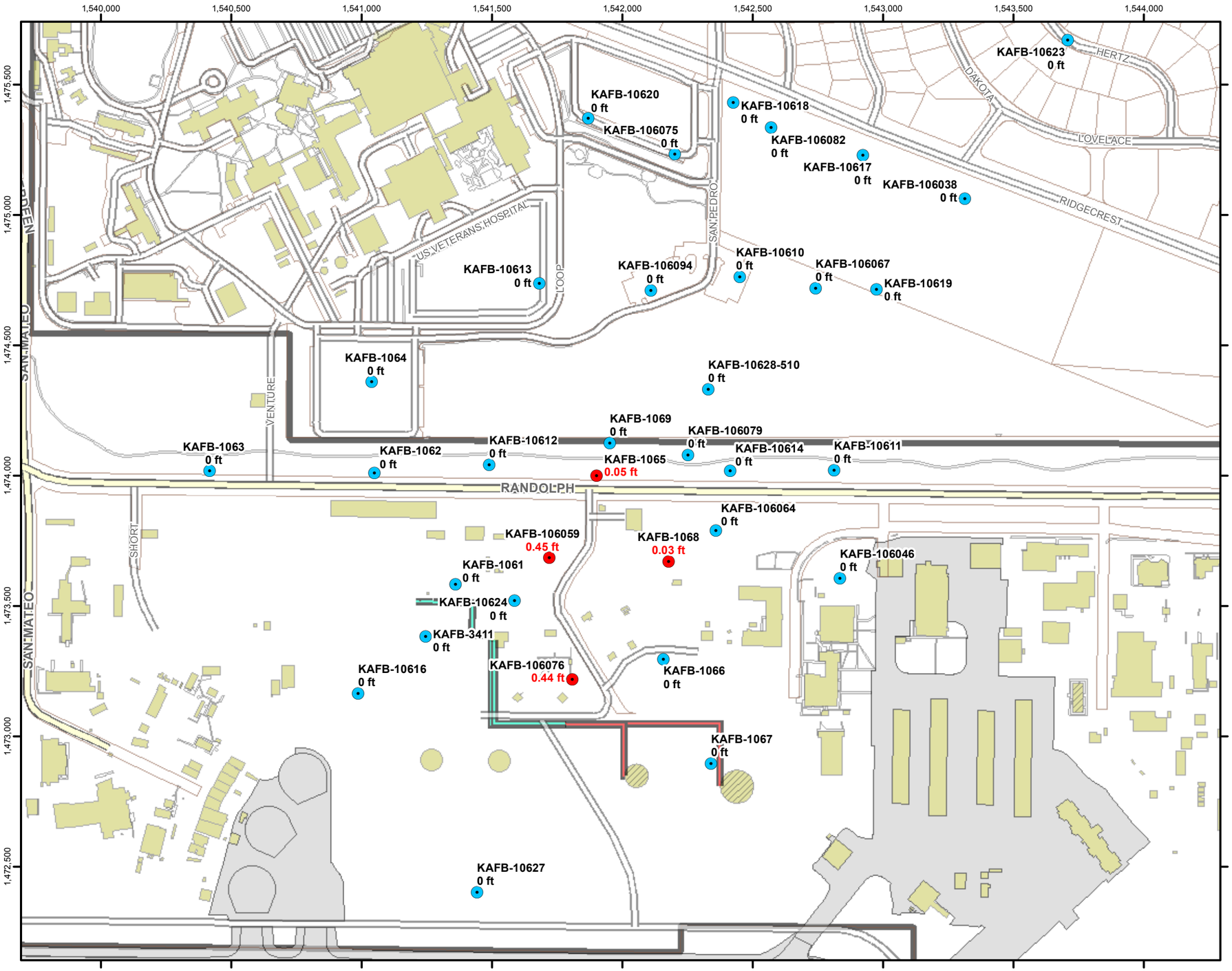
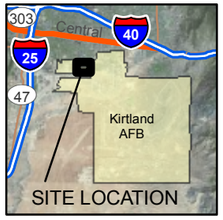


Legend

- Monitor Well With NAPL
- Monitor Well Without NAPL
- Interstate
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Parcels
- Existing Structure
- Previously Existing Structure
- Runway
- Sidewalk
- Installation Boundary



Revision Date: 02/21/12

N

0 200 400 800

Feet

1 inch = 400 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-14

NAPL THICKNESS
SHALLOW GROUNDWATER
DECEMBER 2011

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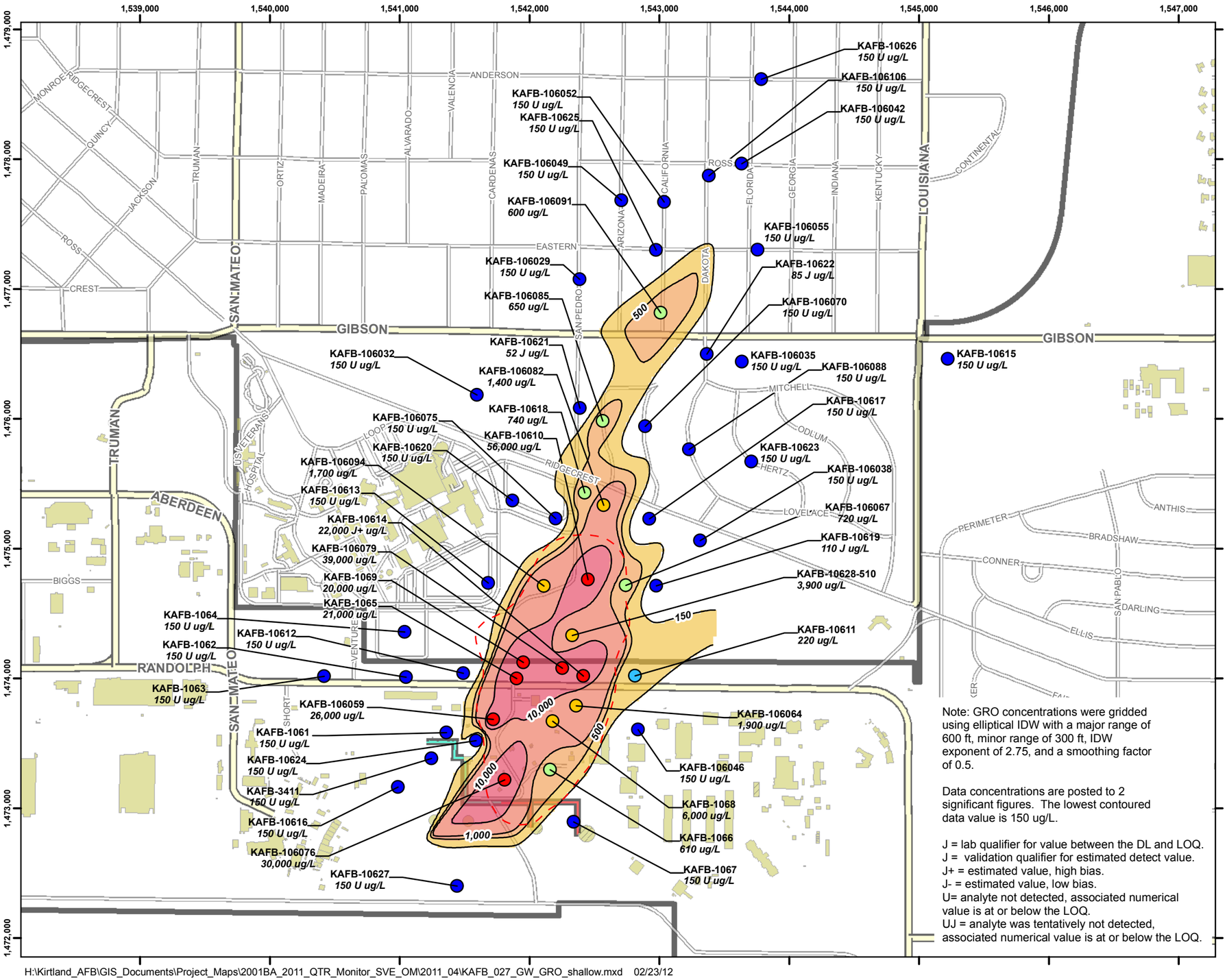
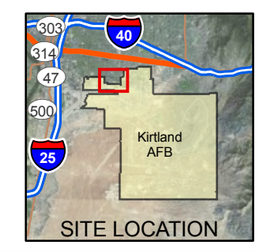


Legend

GRO Result (ug/L)
- 52 - 150
- 160 - 500
- 510 - 1,000
- 1,100 - 10,000
- 11,000 - 56,000
- Historical Area of Observed NAPL (July 2009)
- GRO Concentration Contour (ug/L)

GRO Concentration (ug/L)
- 52 - 150
- 150 - 500
- 500 - 1,000
- 1,000 - 10,000
- 10,000 - 57,000

- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 02/23/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: GRO concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.75, and a smoothing factor of 0.5.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 150 ug/L.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-15

GASOLINE RANGE ORGANICS CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_027_GW_GRO_shallow.mxd 02/23/12

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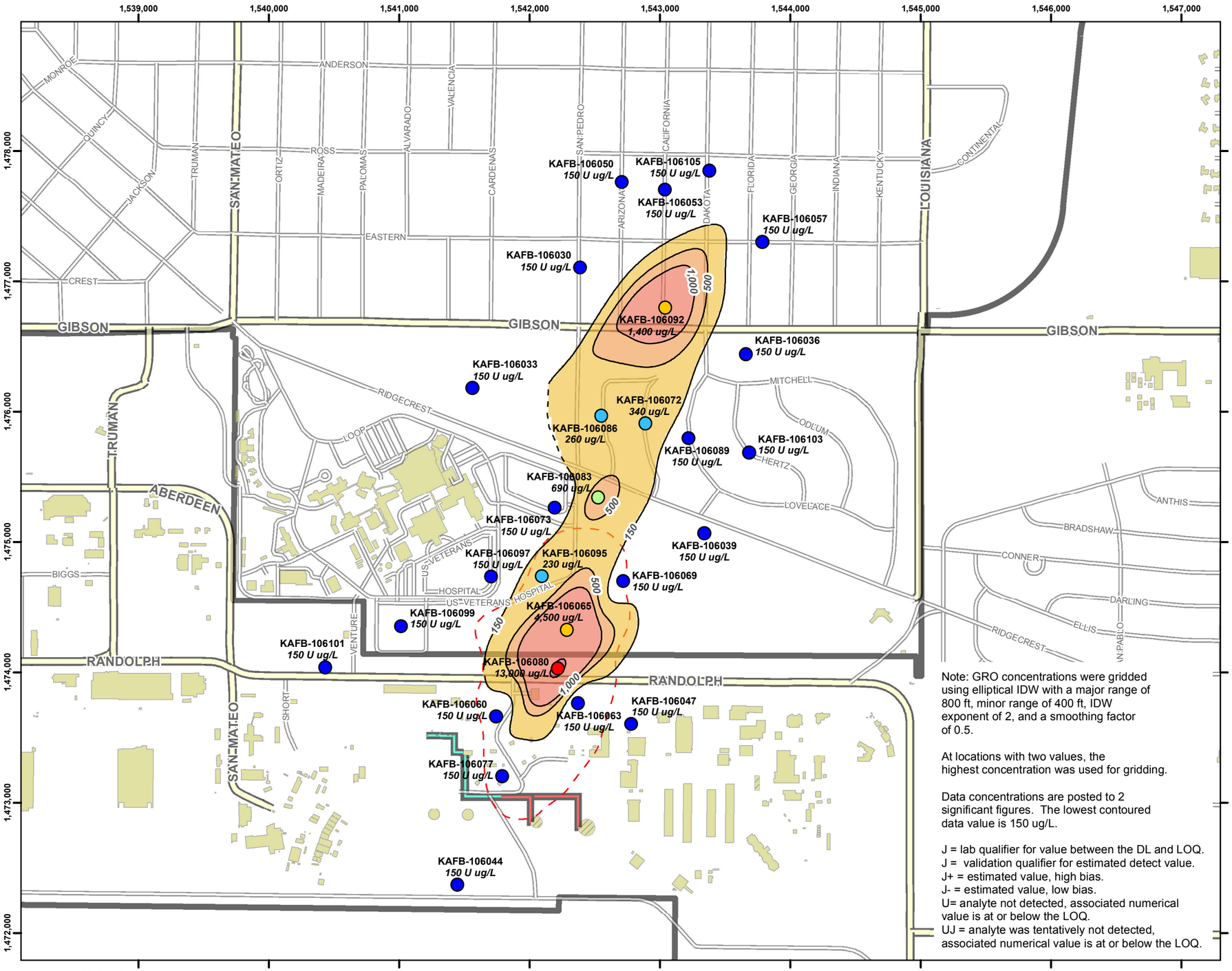


Legend

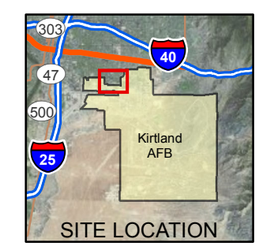
GRO Result (ug/L)

- 150
- 160 - 500
- 510 - 1,000
- 1,100 - 10,000
- 11,000 - 13,000
- GRO Concentration Contour (ug/L) (line is dashed where approximated)

GRO Concentration (ug/L)

- 75 - 150
- 150 - 500
- 500 - 1,000
- 1,000 - 10,000
- 10,000 - 13,000
- Historical Area of Observed NAPL (July 2009)

- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: GRO concentrations were gridded using elliptical IDW with a major range of 800 ft, minor range of 400 ft, IDW exponent of 2, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 150 ug/L.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Revision Date: 03/16/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-16

GASOLINE RANGE ORGANICS CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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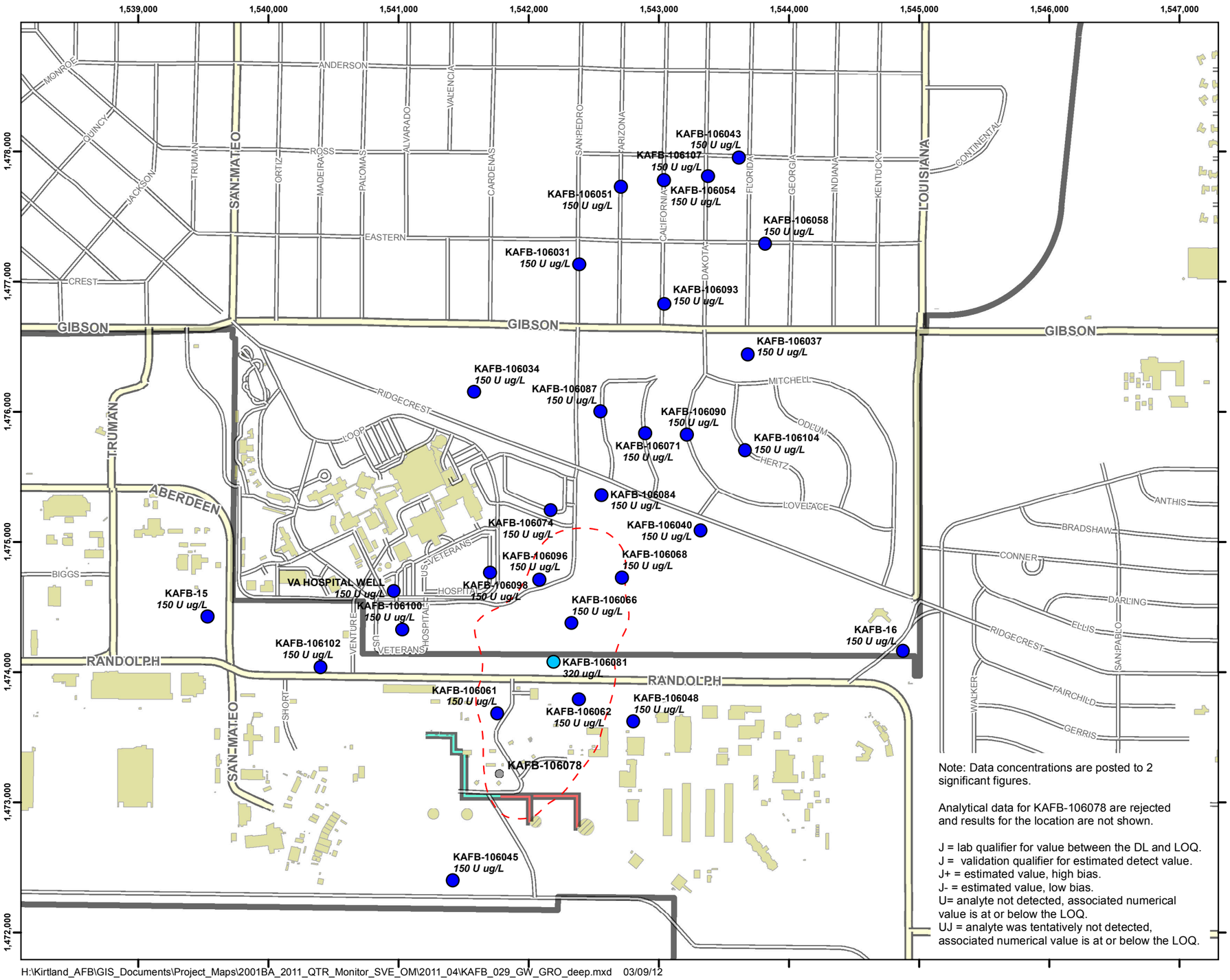
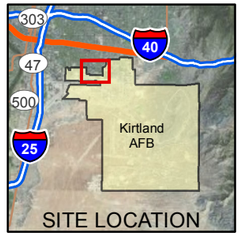


Legend

GRO Result (ug/L)

- 150
- 160 - 500
- 510 - 5,000
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 03/09/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-17

GASOLINE RANGE ORGANICS CONCENTRATIONS IN DEEP GROUNDWATER

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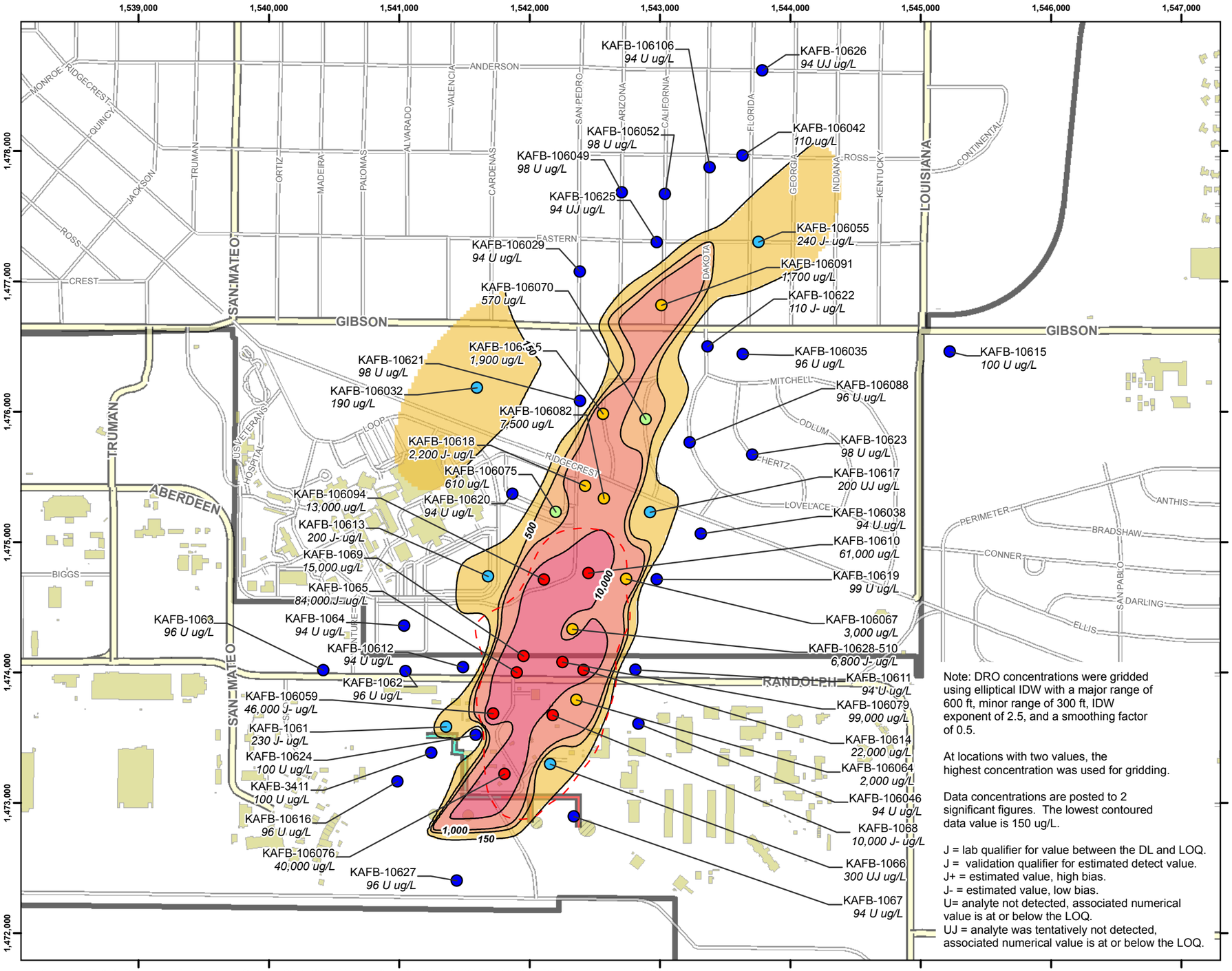


Note: DRO concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.5, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 150 ug/L.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

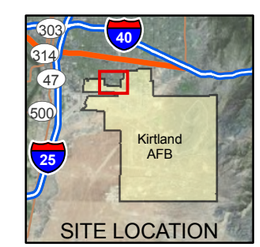
DRO Result (ug/L)

- 93 - 150
- 160 - 500
- 510 - 1,000
- 1,000 - 10,000
- 10,100 - 99,000
- Historical Area of Observed NAPL (July 2009)
- DRO Concentration Contour (ug/L)

DRO Concentration (ug/L)

- 47 - 150
- 150 - 500
- 500 - 1,000
- 1,000 - 10,000
- 10,000 - 98,000

- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/23/12

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-18

DIESEL RANGE ORGANIC CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_030_GW_DRO_shallow.mxd 02/23/12

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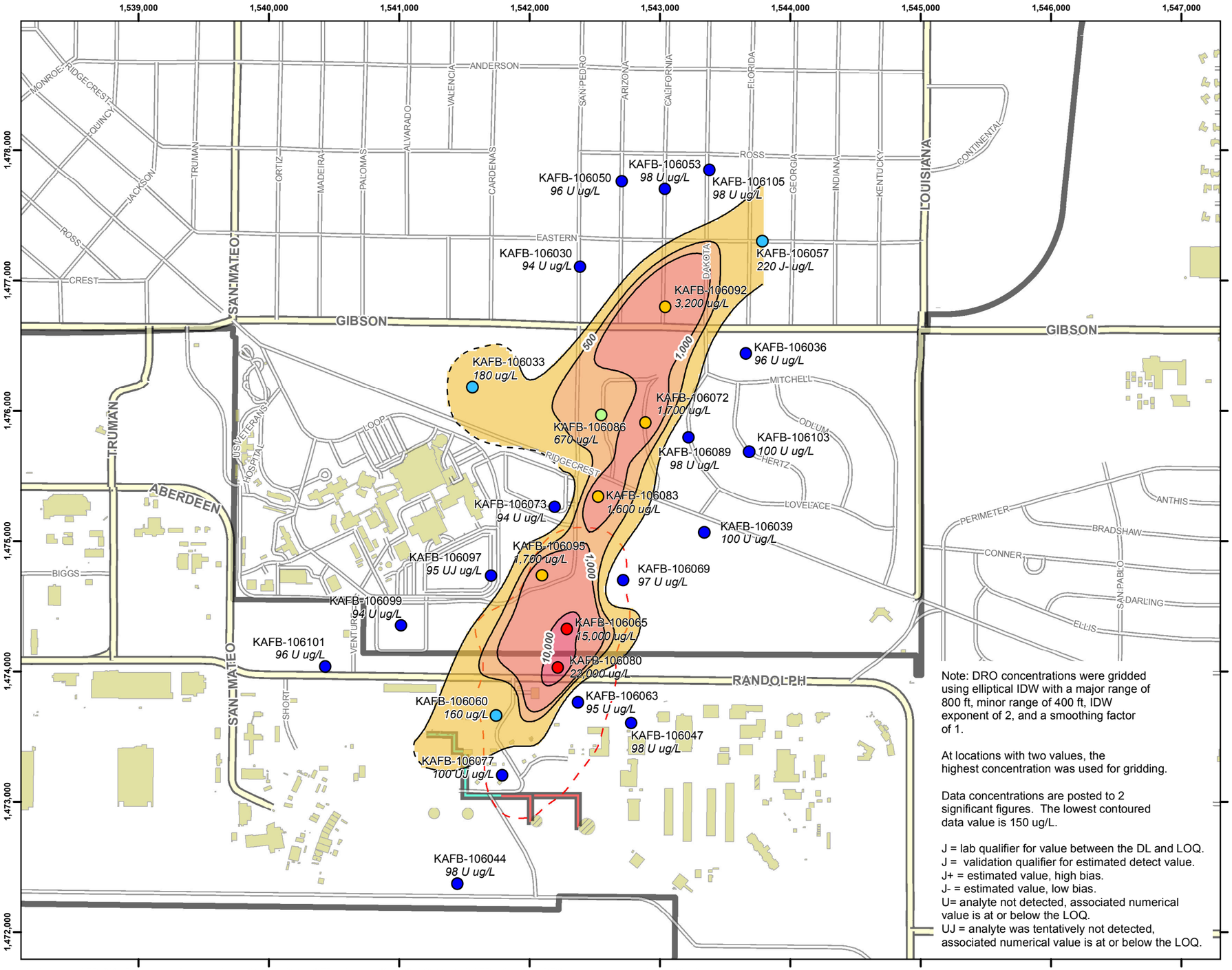


Legend

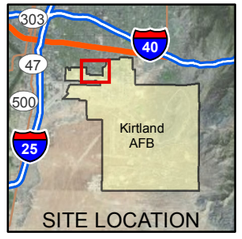
DRO Result (ug/L)

- 94 - 150
- 160 - 500
- 510 - 1,000
- 1,100 - 10,000
- 10,000 - 22,000
- DRO Concentration Contour (ug/L) (line is dashed where approximated)

DRO Concentration (ug/L)

- 47 - 150
- 150 - 500
- 500 - 1,000
- 1,000 - 10,000
- 10,000 - 22,000
- Historical Area of Observed NAPL (July 2009)

- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: DRO concentrations were gridded using elliptical IDW with a major range of 800 ft, minor range of 400 ft, IDW exponent of 2, and a smoothing factor of 1.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 150 ug/L.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-19

DIESEL RANGE ORGANIC CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_031_GW_DRO_intermediate.mxd 03/16/12

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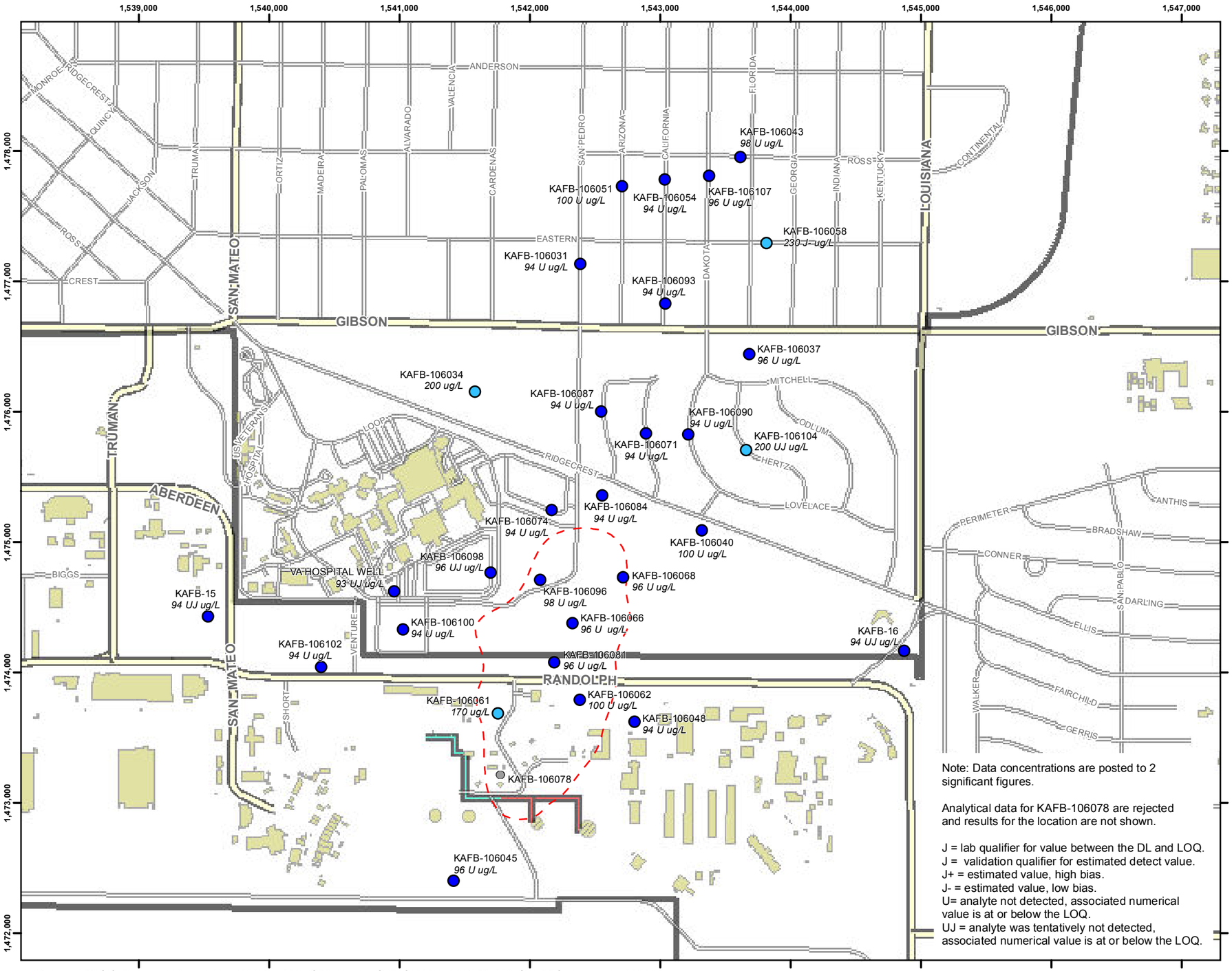


Note: Data concentrations are posted to 2 significant figures.

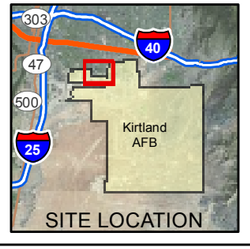
Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

DRO Result (ug/L)

- 92 - 150
- 160 - 500
- 510 - 1,000
- 1,100 - 10,000
- 10,100 - 15,000
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-20

DIESEL RANGE ORGANIC CONCENTRATIONS IN DEEP GROUNDWATER

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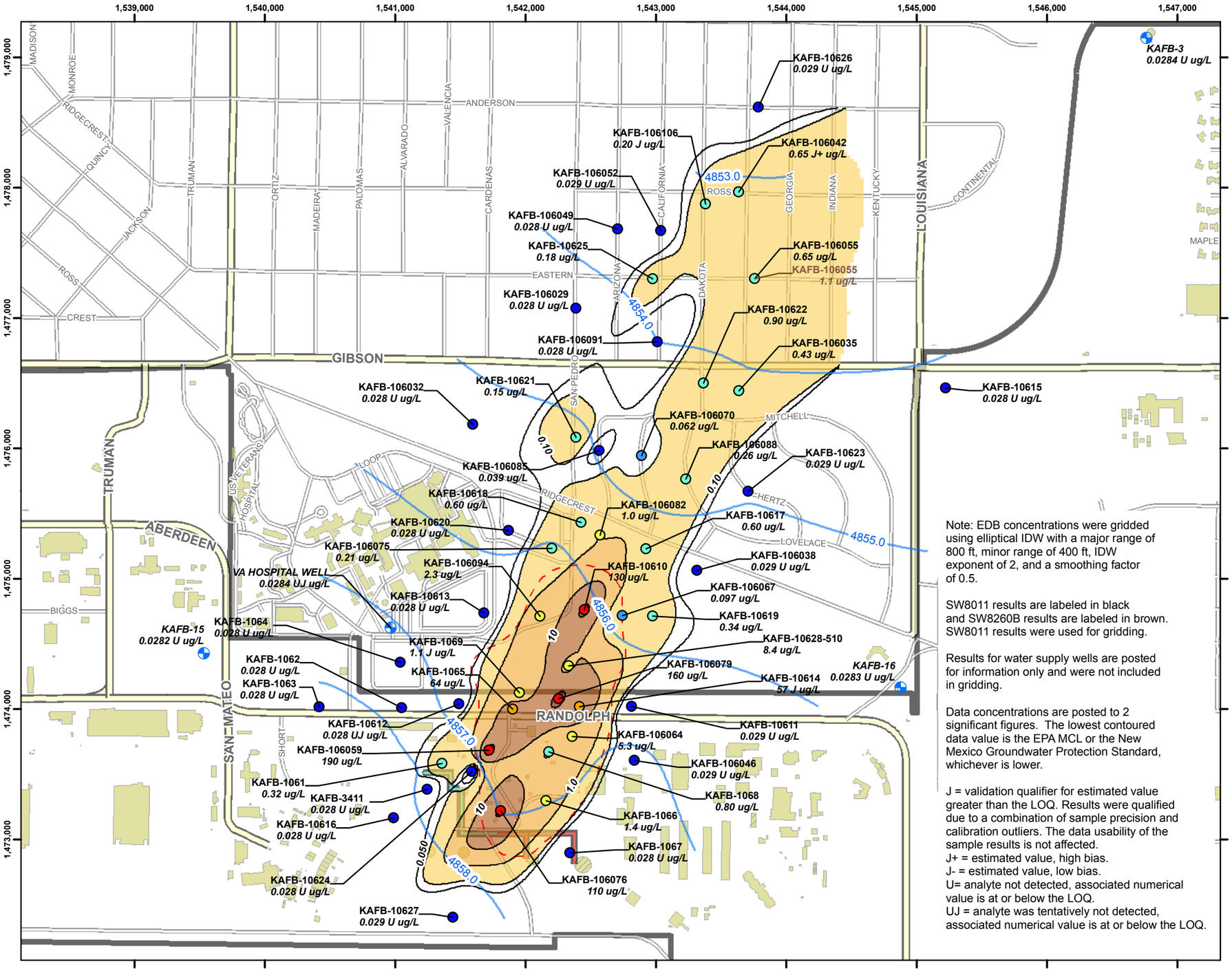


Note: EDB concentrations were gridded using elliptical IDW with a major range of 800 ft, minor range of 400 ft, IDW exponent of 2, and a smoothing factor of 0.5.

SW8011 results are labeled in black and SW8260B results are labeled in brown. SW8011 results were used for gridding.

Results for water supply wells are posted for information only and were not included in gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

J = validation qualifier for estimated value greater than the LOQ. Results were qualified due to a combination of sample precision and calibration outliers. The data usability of the sample results is not affected.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

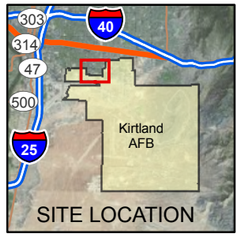
- Water Supply Well

EDB Result (ug/L)
- 0.028 - 0.050
- 0.051 - 0.10
- 0.11 - 1.0
- 1.1 - 10
- 11 - 100
- 110 - 190

- Groundwater Level Contour (ft msl)
- EDB Concentration Contour (ug/L)

EDB Concentration (ug/L)
- 0.01 - 0.1
- 0.1 - 1.0
- 1.0 - 10
- 10 - 100
- 100 - 190

- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Line
- Underground Fuel Transfer Line
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 02/23/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-21

1,2-DIBROMOETHANE (EDB) CONCENTRATIONS IN SHALLOW GROUNDWATER

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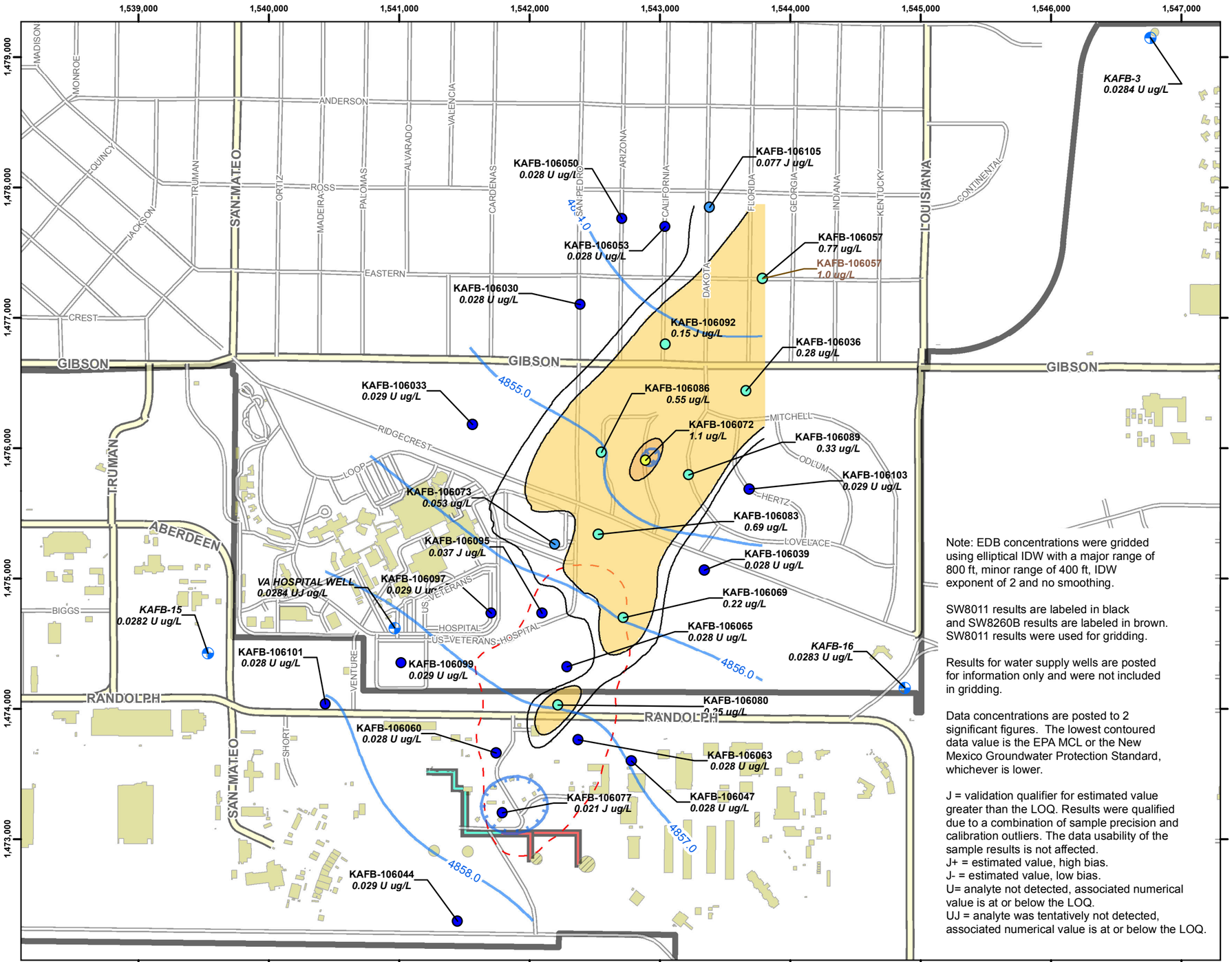
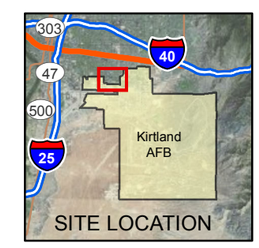


Legend

- Water Supply Well
- EDB Result (ug/L)
  - 0.021 - 0.050
  - 0.051 - 0.10
  - 0.11 - 1.0
  - 1.1
- EDB Concentration Contour (ug/L)
- EDB Concentration (ug/L)
  - 0.01 - 0.1
  - 0.1 - 1.0
  - 1.0 - 1.1
- Historical Area of Observed NAPL (July 2009)
- Groundwater Level Contour (ft msl)
- Groundwater Depression
- Major Road
- Road
- Aboveground Fuel Transfer Line
- Aboveground Fuel Transfer Line
- Existing Structure
- Previously Existing Structure
- Installation Boundary



Note: EDB concentrations were gridded using elliptical IDW with a major range of 800 ft, minor range of 400 ft, IDW exponent of 2 and no smoothing.

SW8011 results are labeled in black and SW8260B results are labeled in brown. SW8011 results were used for gridding.

Results for water supply wells are posted for information only and were not included in gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

J = validation qualifier for estimated value greater than the LOQ. Results were qualified due to a combination of sample precision and calibration outliers. The data usability of the sample results is not affected.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

N

Revision Date: 03/16/12

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-22

1,2-DIBROMOETHANE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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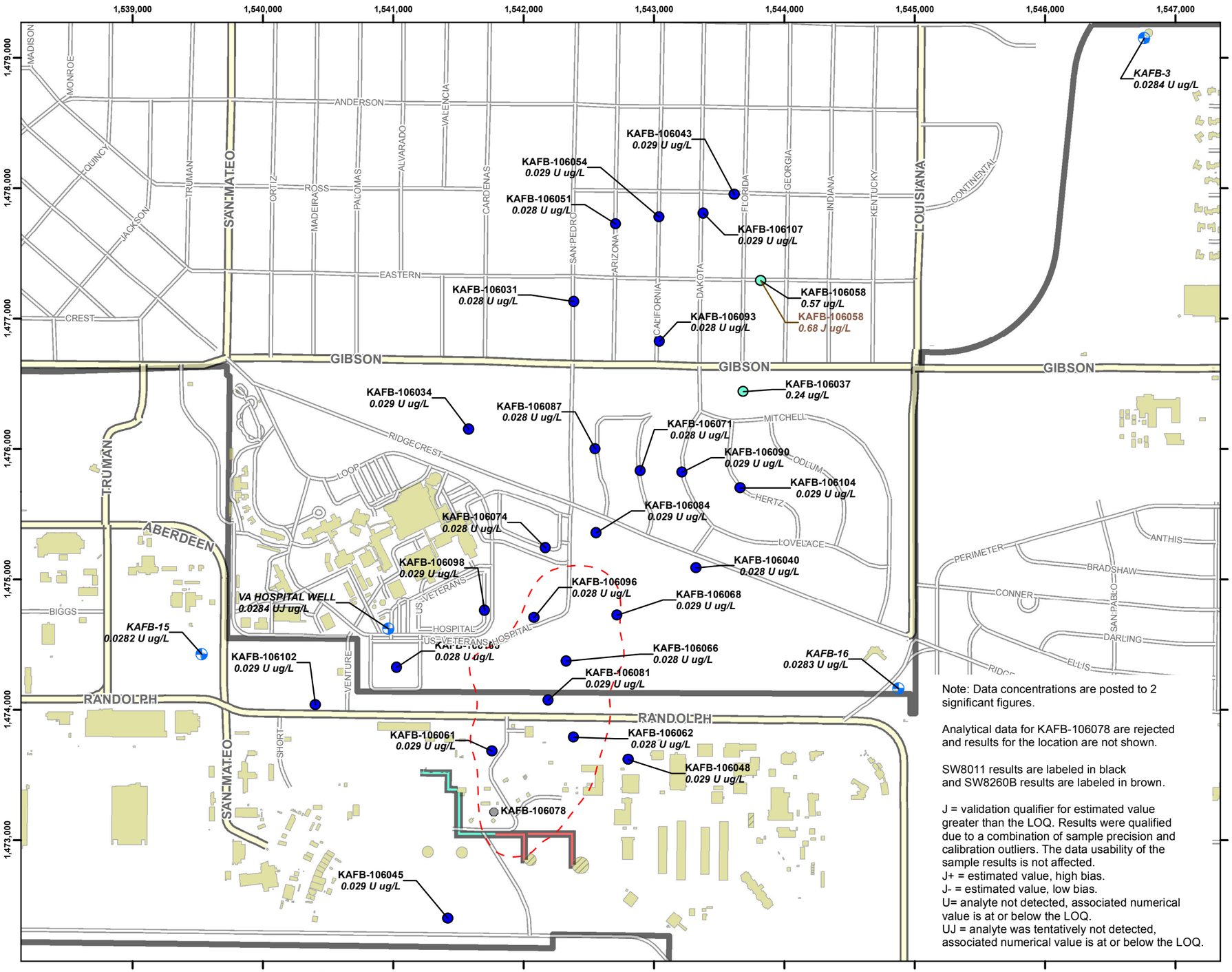
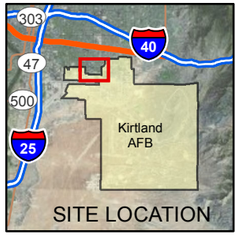


Legend

- Water Supply Well

EDB Result (ug/L)

- 0.028 - 0.050
- 0.051 - 0.10
- 0.11 - 0.57
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Structure
- Previously Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

SW8011 results are labeled in black and SW8260B results are labeled in brown.

J = validation qualifier for estimated value greater than the LOQ. Results were qualified due to a combination of sample precision and calibration outliers. The data usability of the sample results is not affected.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-23

1,2-DIBROMOETHANE CONCENTRATIONS IN DEEP GROUNDWATER

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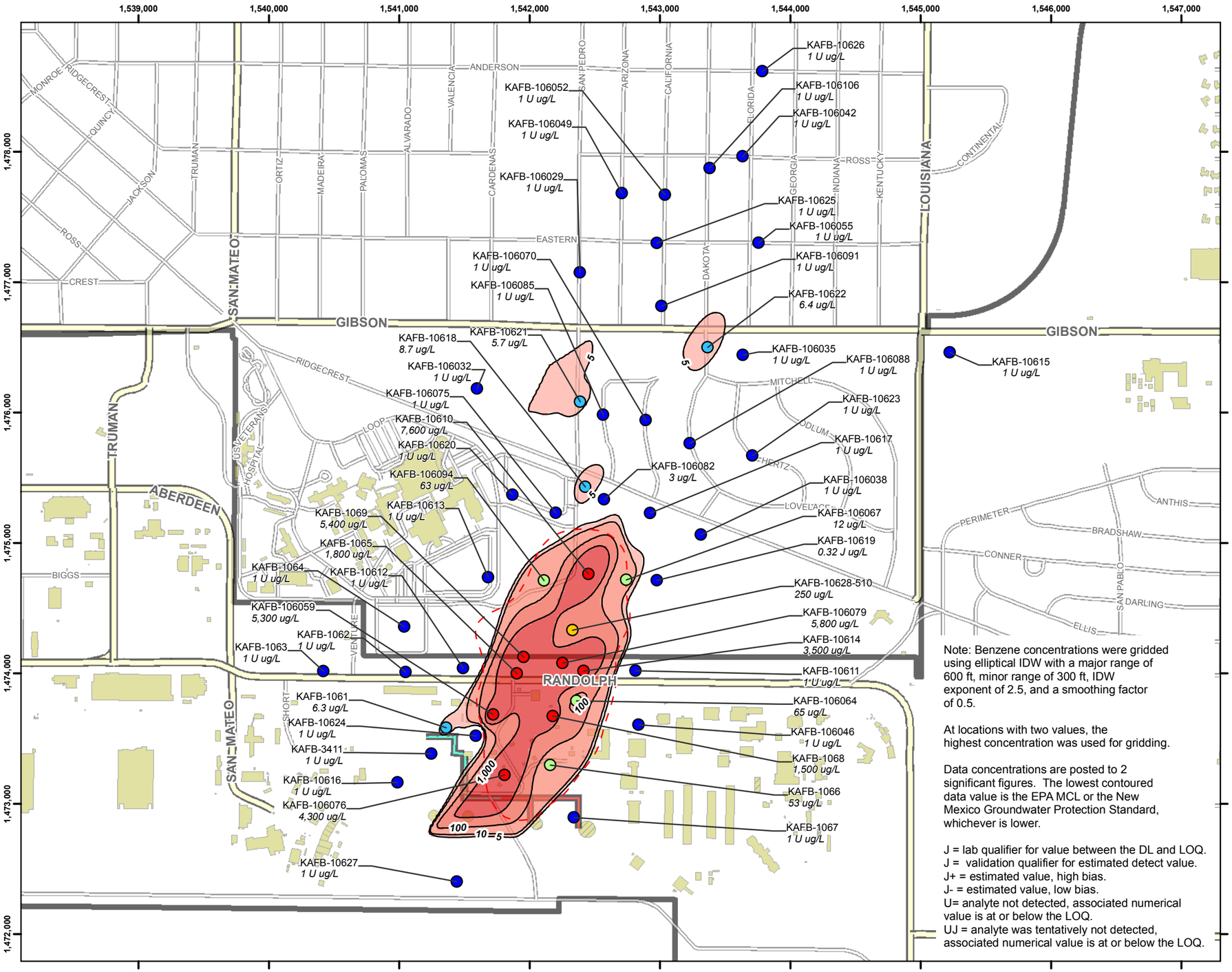


Legend

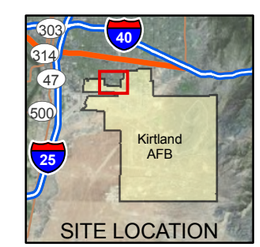
Benzene Result (ug/L)

- 0.32 - 5.0
- 5.1 - 10
- 11 - 100
- 110 - 1,000
- 1,100 - 7,600
- Historical Area of Observed NAPL (July 2009)
- Benzene Concentration Contour (ug/L)

Benzene Concentration (ug/L)

- 0.25 - 5
- 5 - 10
- 10 - 100
- 100 - 1,000
- 1,000 - 7,600

- Major Road
- Road
- Aboveground Fuel Transfer Line
- Underground Fuel Transfer Line
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Benzene concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.5, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Revision Date: 02/23/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-24

BENZENE
CONCENTRATIONS IN
SHALLOW GROUNDWATER

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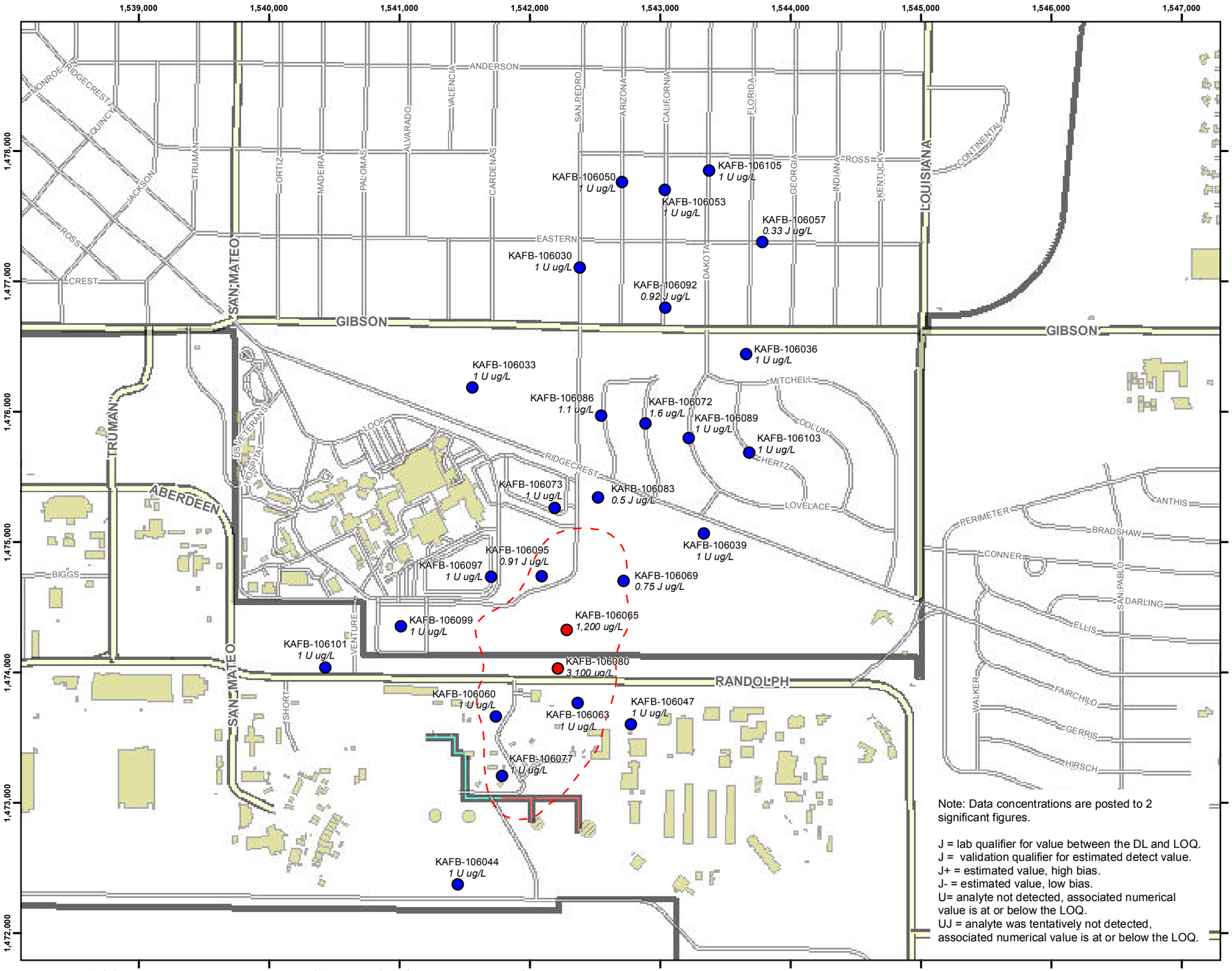
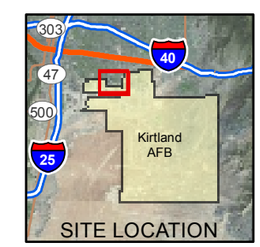


Legend

Benzene Result (ug/L)

- 0.33 - 5.0
- 5.1 - 10
- 11 - 100
- 110 - 1,000
- 1,100 - 3,100
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/12/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-25

BENZENE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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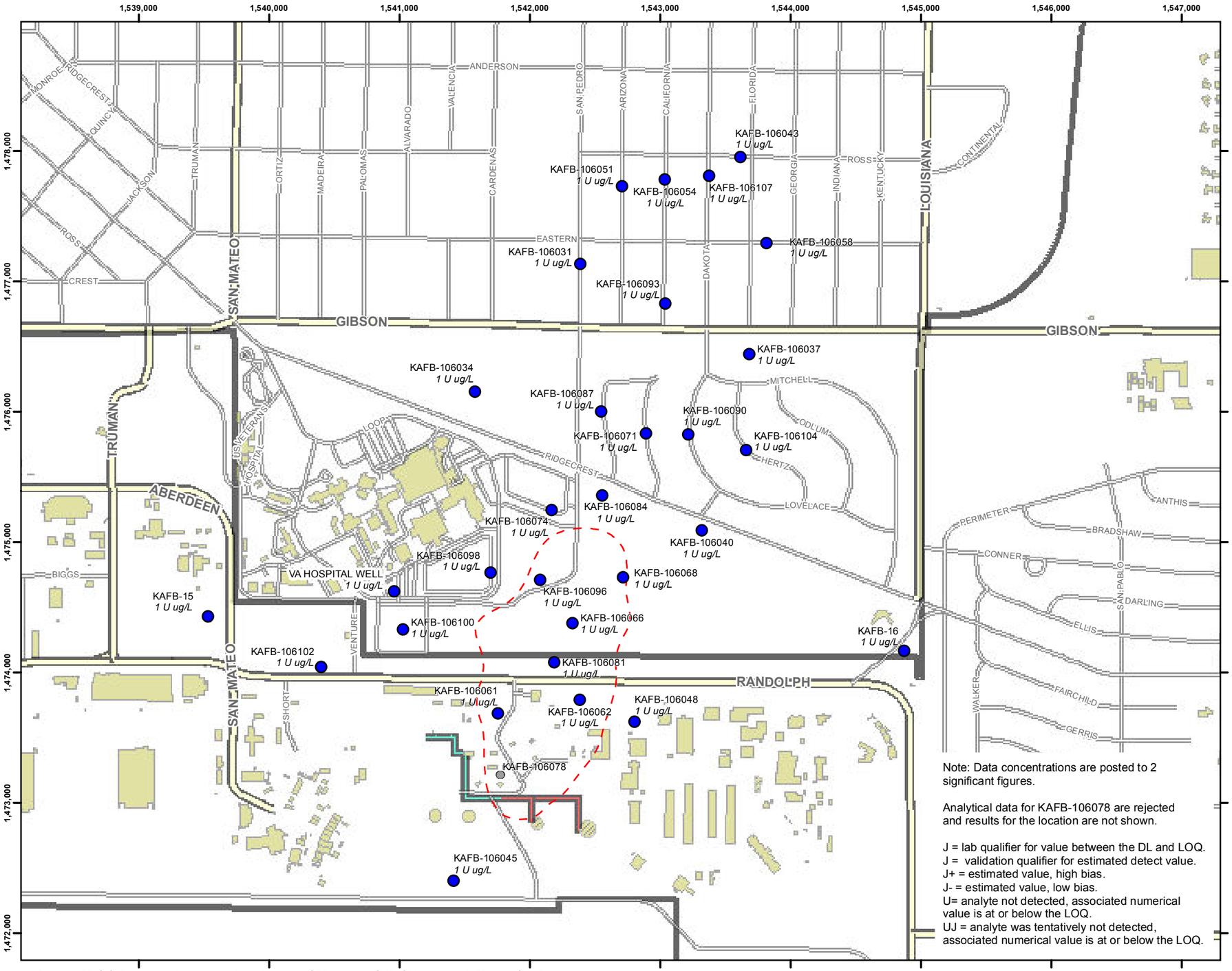


Note: Data concentrations are posted to 2 significant figures.

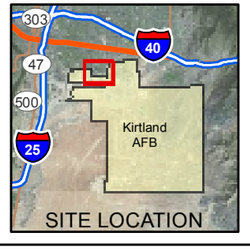
Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

Benzene Result (ug/L)

- 1.0
- 1,200
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

0 400 800 1,600
Feet
1 inch = 800 feet

Revision Date: 03/12/12

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-26

BENZENE CONCENTRATIONS IN DEEP GROUNDWATER

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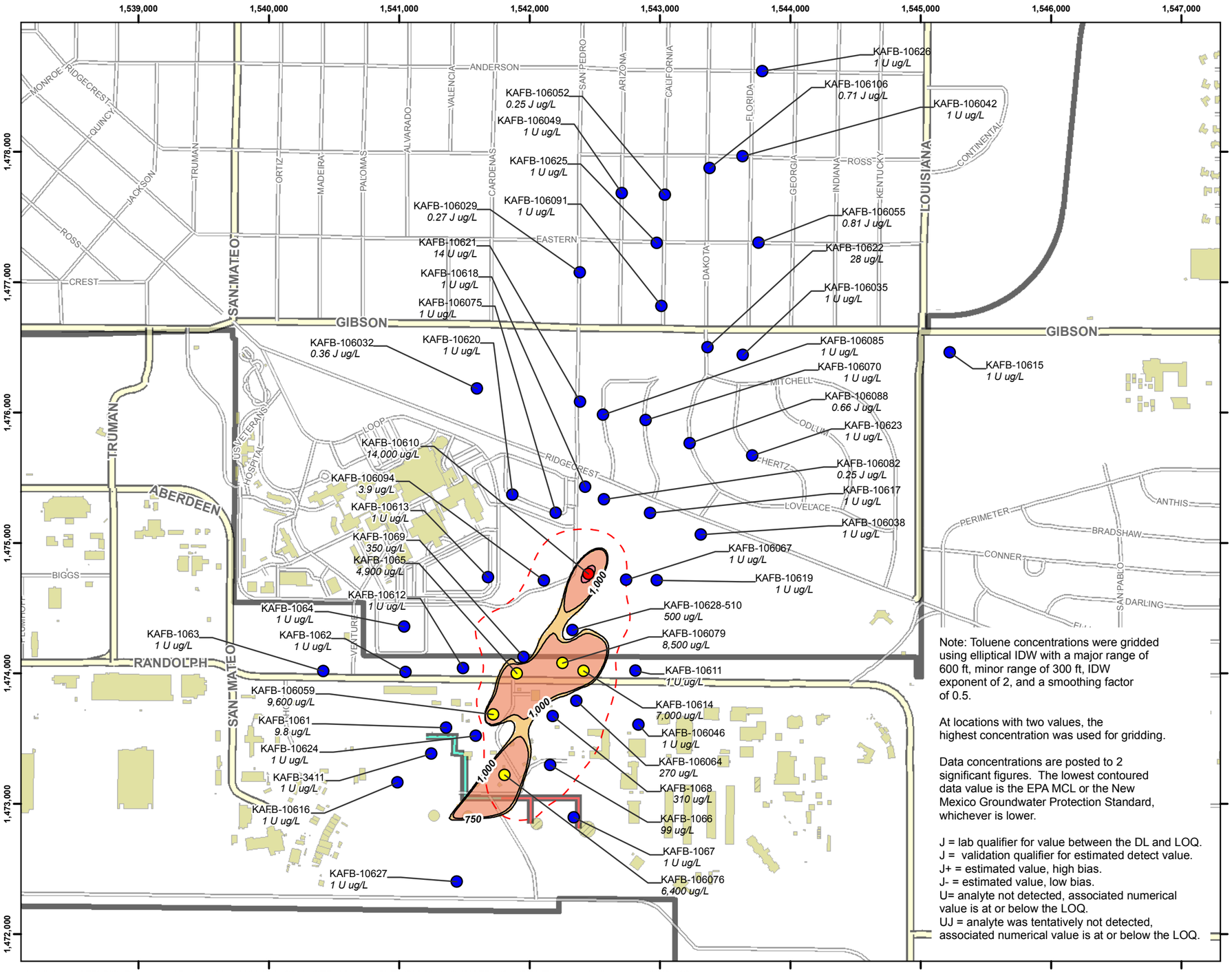


Note: Toluene concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

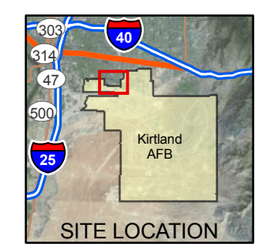
J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

Toluene Result (ug/L)
- 0.25 - 750
- 760 - 1,000
- 1,100 - 10,000
- 11,000 - 14,000
- Historical Area of Observed NAPL (July 2009)
- Toluene Concentration Contour (ug/L)

Toluene Concentration (ug/L)
- 0.30 - 750
- 750 - 1,000
- 1,000 - 10,000
- 10,000 - 14,000

- Major Road
- Road
- Aboveground Fuel Transfer Line
- Underground Fuel Transfer Line
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600
Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-27

TOLUENE CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_036_GW_Toluene_shallow.mxd 02/24/12

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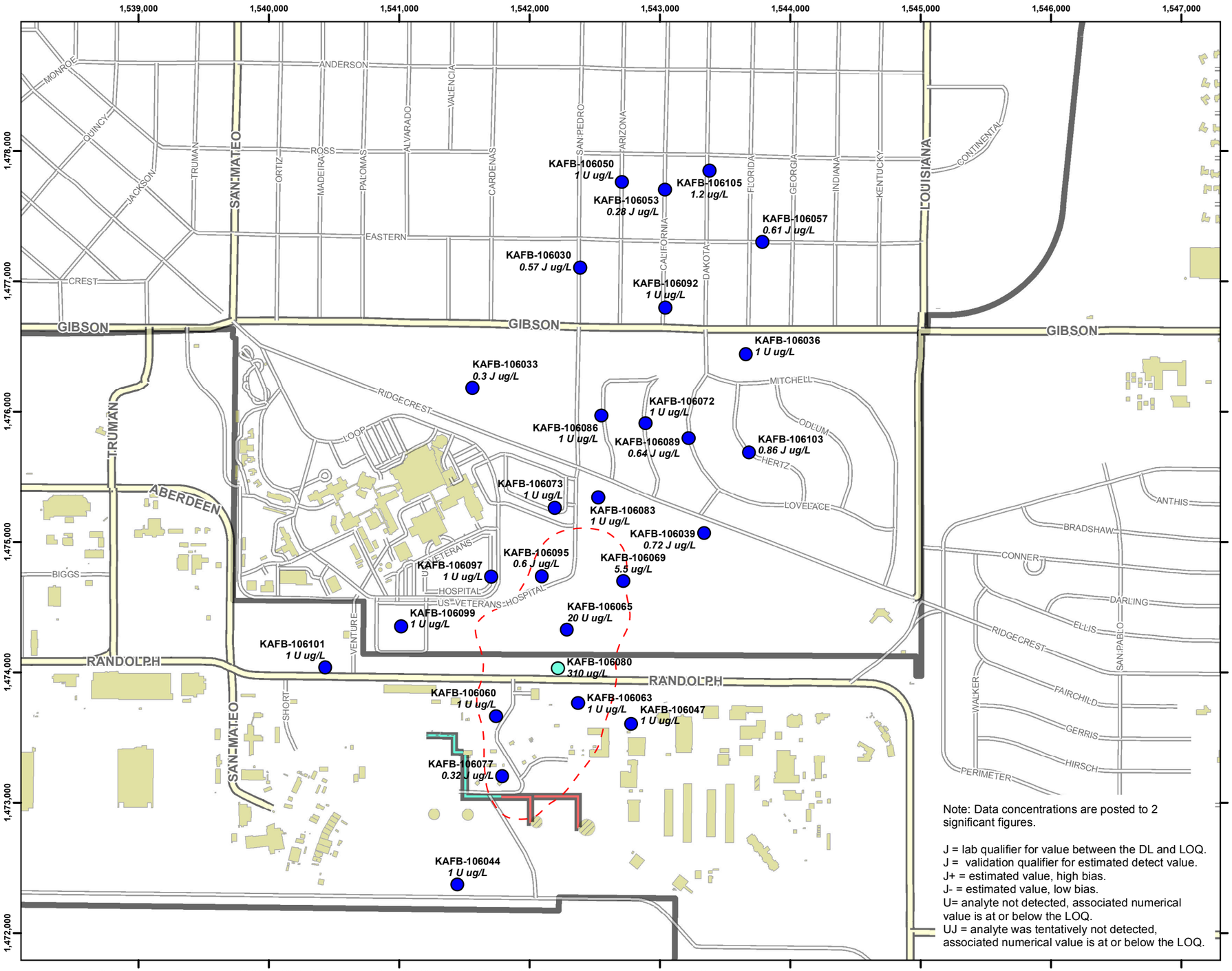
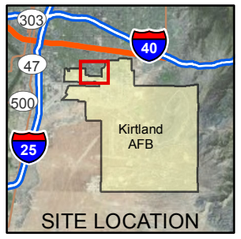


Legend

Toluene Result (ug/L)

- 0.28 - 99
- 100 - 310
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 03/09/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-28

TOLUENE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_037_GW_Toluene_intermediate.mxd 03/09/12

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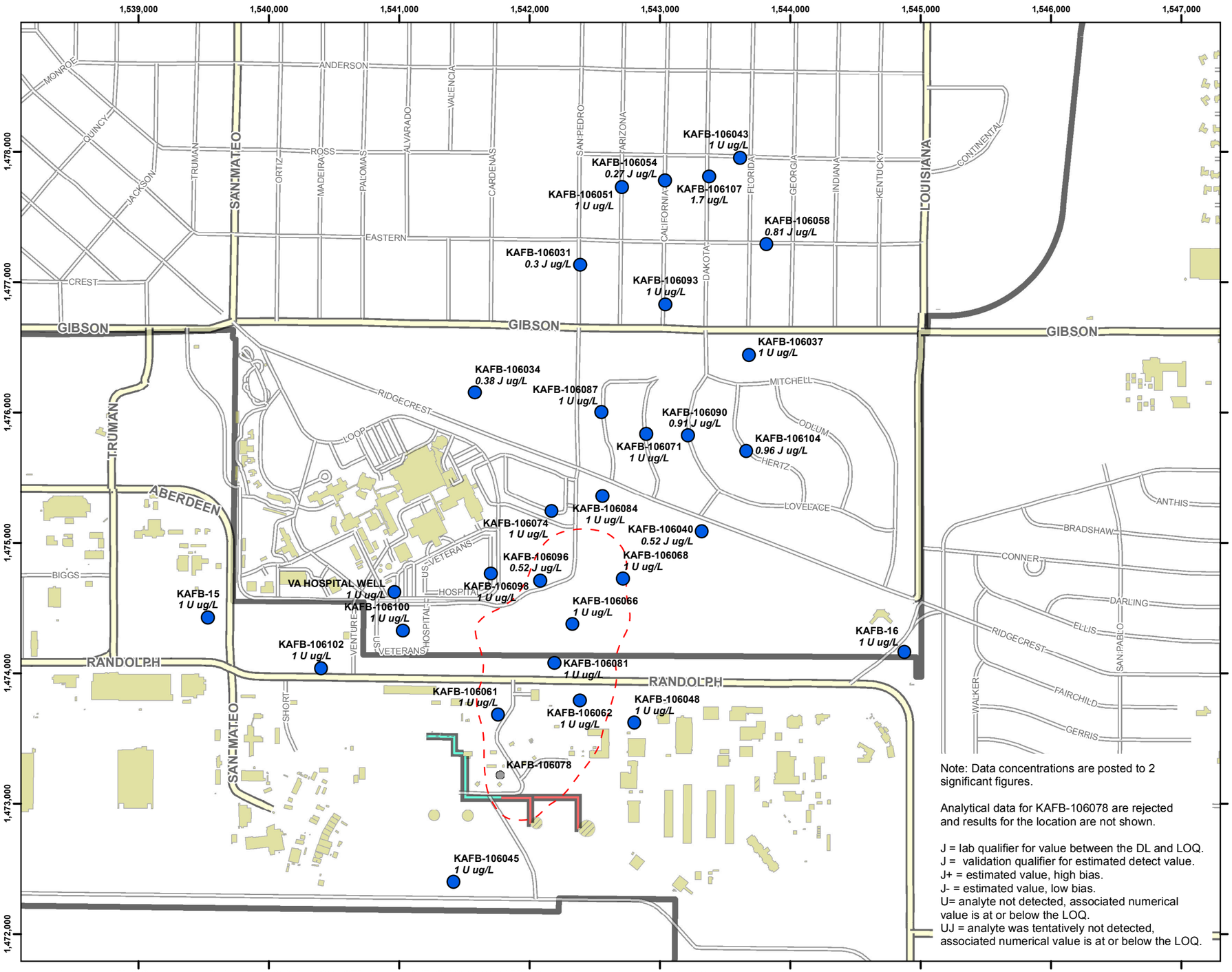
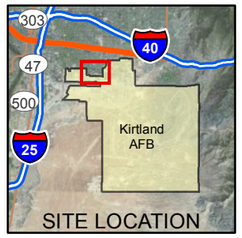


Legend

Toluene Result (ug/L)

- 0.27 - 20
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 03/09/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-29

TOLUENE CONCENTRATIONS IN DEEP GROUNDWATER

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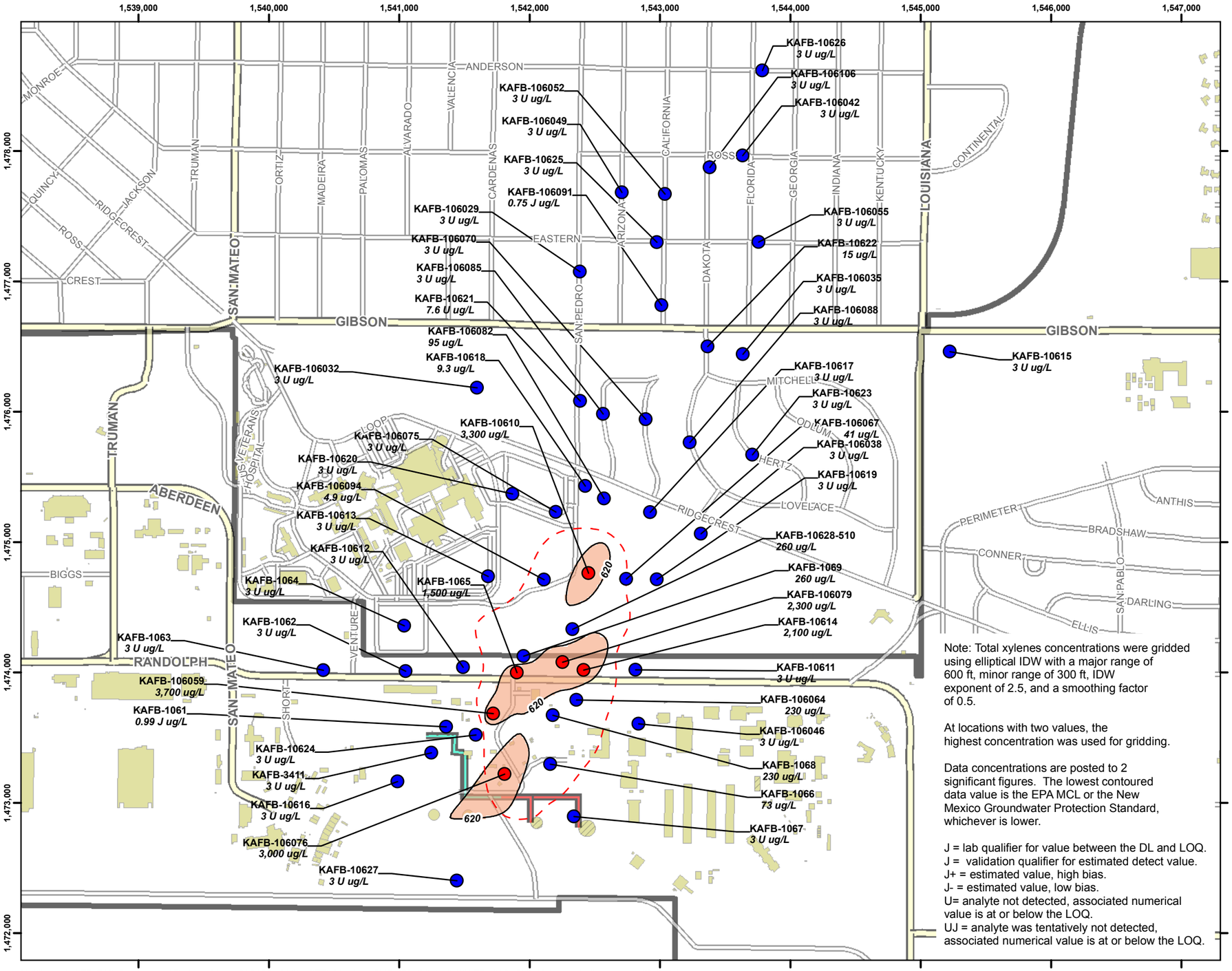


Note: Total xylenes concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.5, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

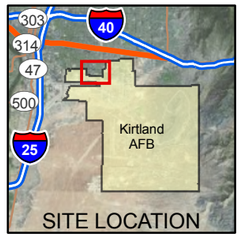
Legend

Total Xylenes Result (ug/L)

- 0.75 - 620
- 630 - 3,700
- Historical Area of Observed NAPL (July 2009)
- Total Xylenes Concentration Contour (ug/L)

Total Xylenes Concentration (ug/L)

- 0.75 - 620
- 620 - 3,700
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 02/24/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-30

TOTAL XYLENES CONCENTRATIONS IN SHALLOW GROUNDWATER

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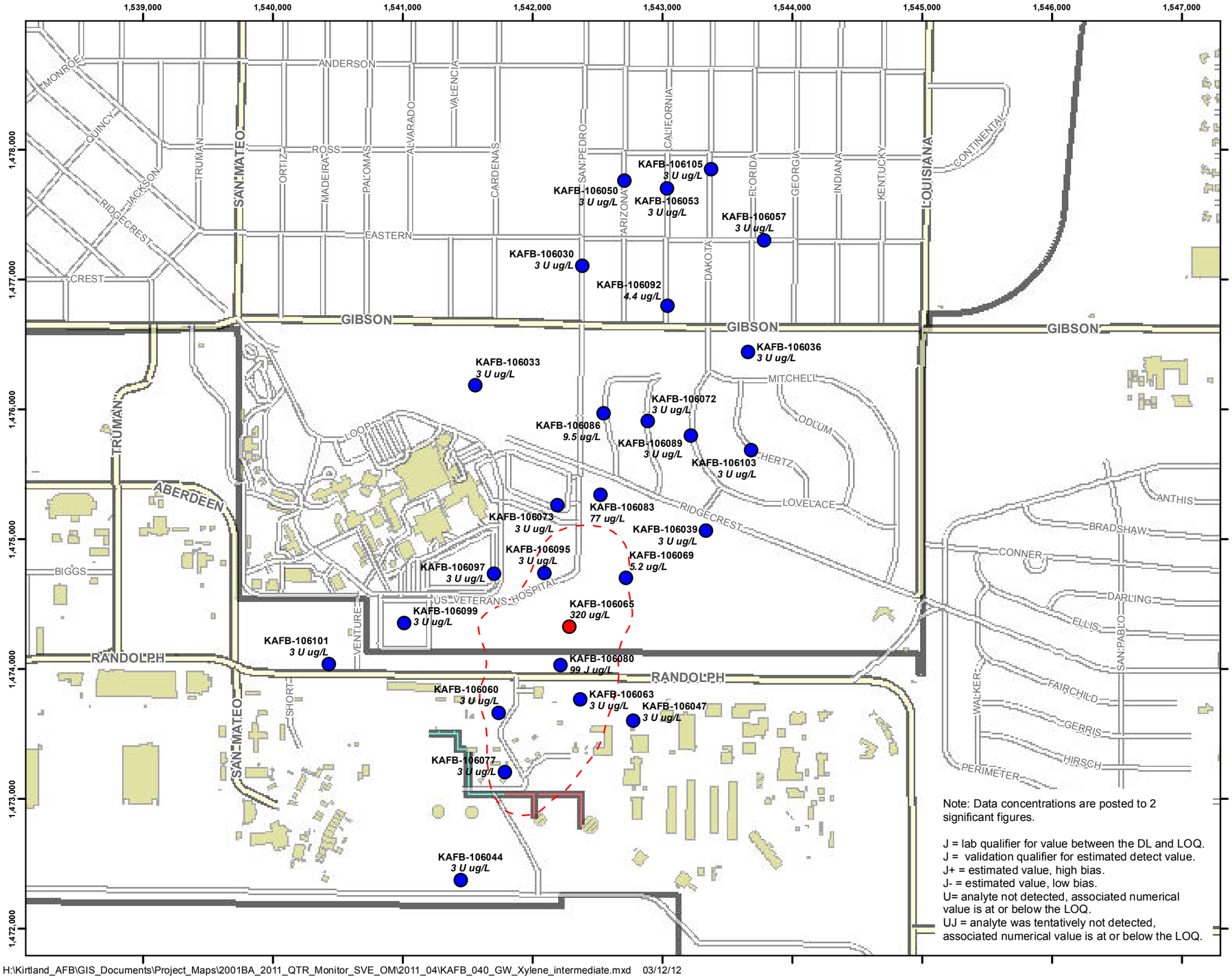


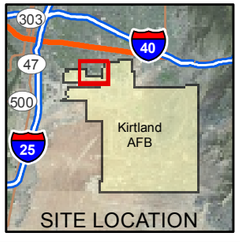
Note: Data concentrations are posted to 2 significant figures.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

Total Xylenes Result (ug/L)

- 3.0 - 99
- 100 - 320
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

0 400 800 1,600
Feet
1 inch = 800 feet

Revision Date: 03/12/12

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-31

TOTAL XYLENES CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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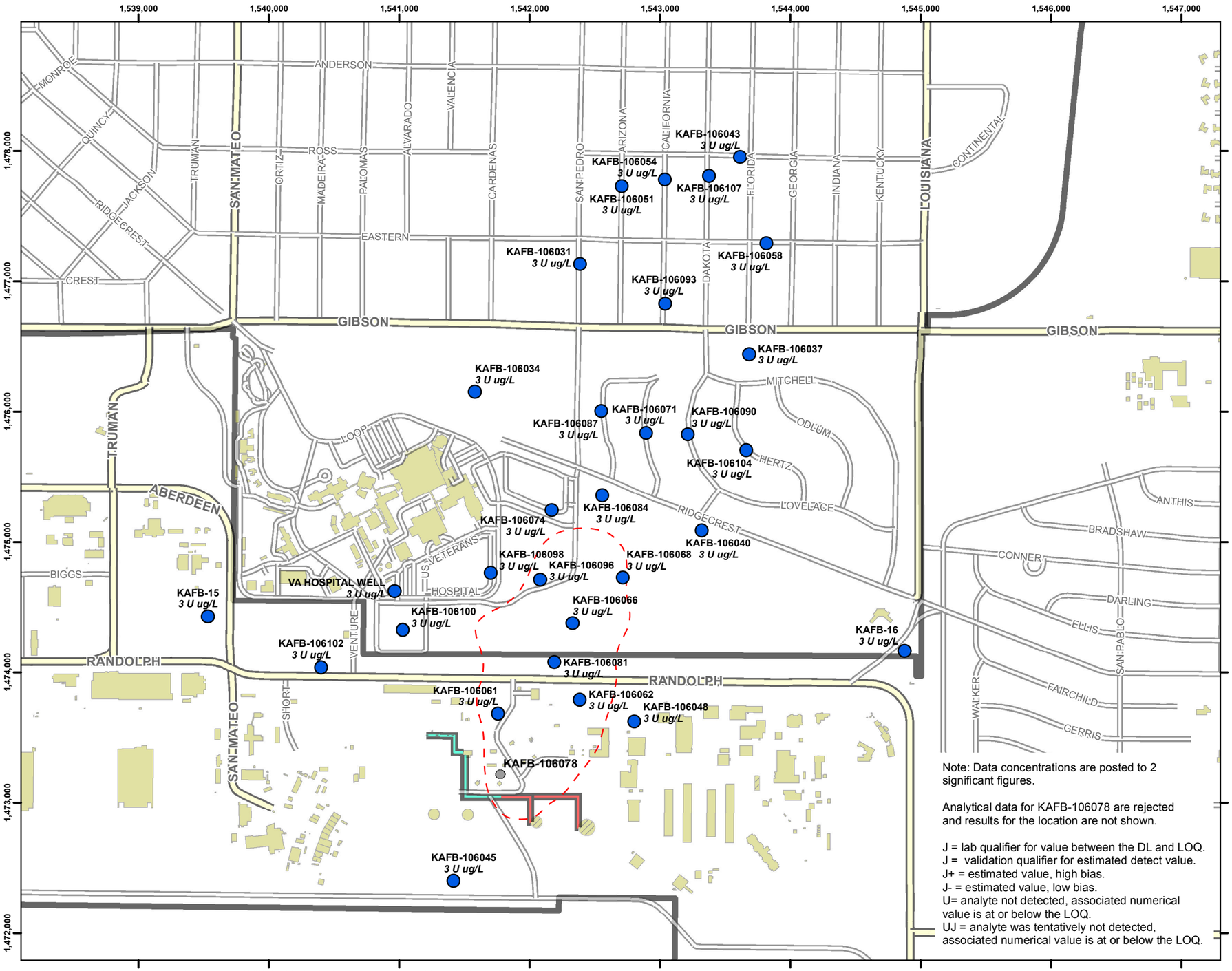
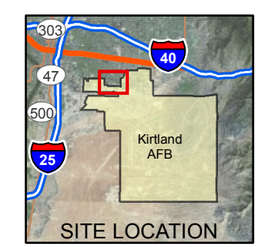


Legend

Total Xylenes Result (ug/L)

- 3.0
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/16/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-32

TOTAL XYLENES CONCENTRATIONS IN DEEP GROUNDWATER

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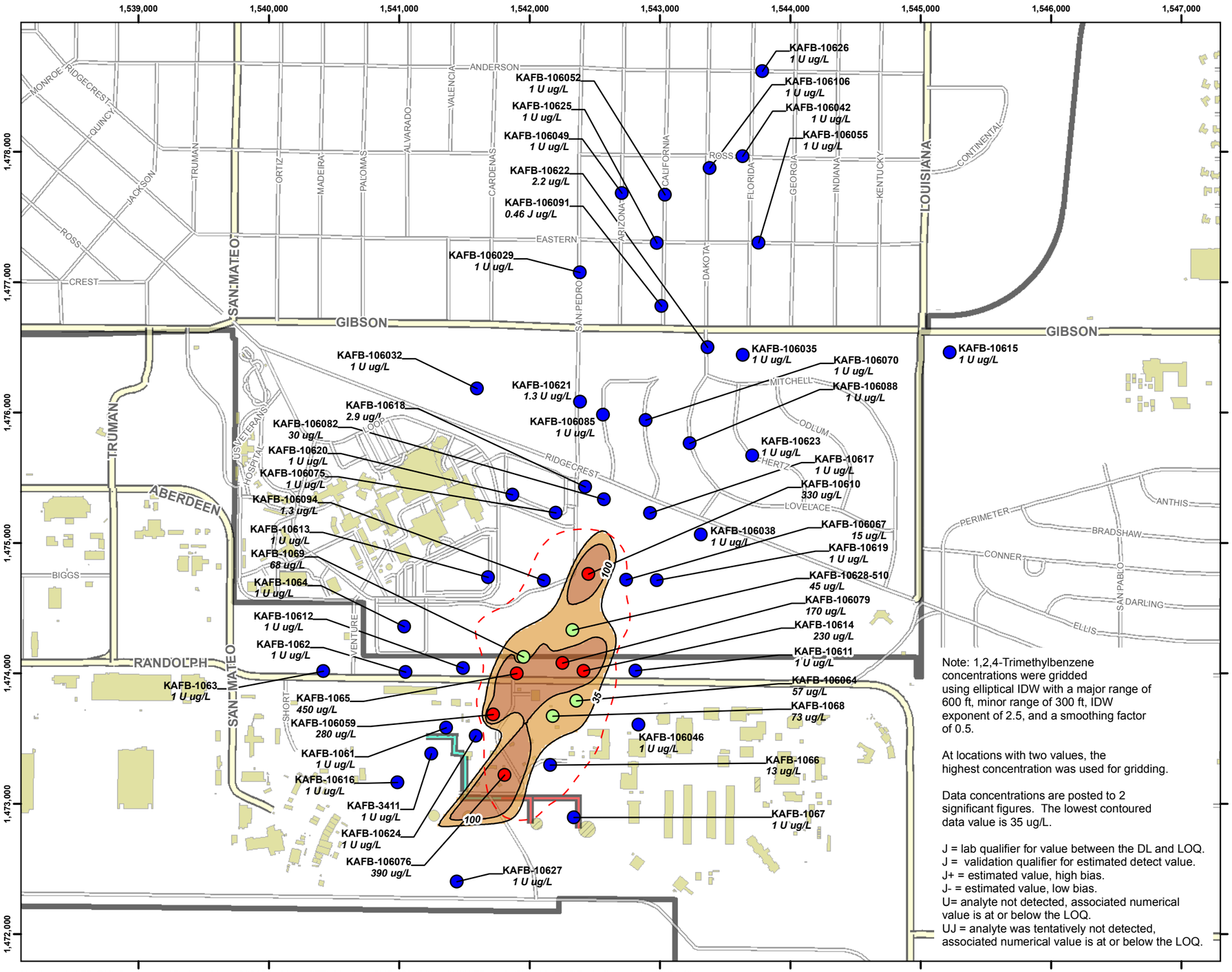


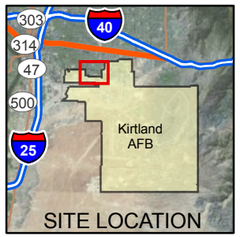
Legend

1,2,4-Trimethylbenzene Result (ug/L)

- 0.46 - 35
- 36 - 100
- 110 - 450
- Historical Area of Observed NAPL (July 2009)
- 1,2,4-Trimethylbenzene Concentration Contour (ug/L)

1,2,4-Trimethylbenzene Concentration (ug/L)

- 0.46 - 35
- 35 - 100
- 100 - 450
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: 1,2,4-Trimethylbenzene concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.5, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 35 ug/L.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Revision Date: 02/24/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-33

1,2,4-TRIMETHYLBENZENE CONCENTRATIONS IN SHALLOW GROUNDWATER

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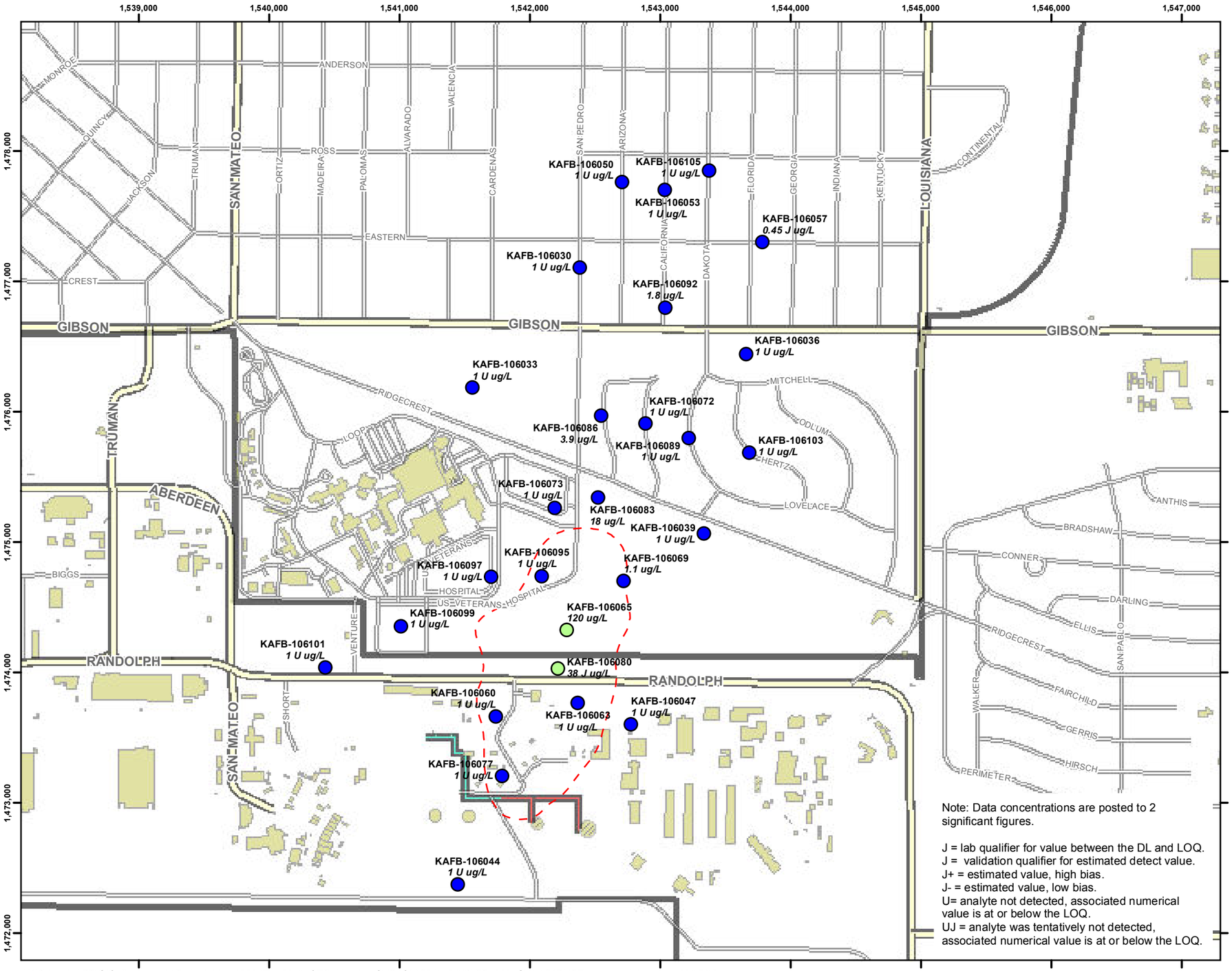
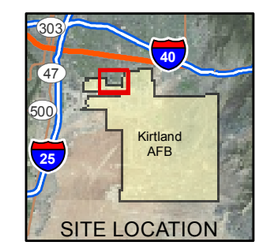


Legend

1,2,4-Trimethylbenzene Result (ug/L)

- 0.42 - 35
- 36 - 120
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/12/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-34

1,2,4-TRIMETHYLBENZENE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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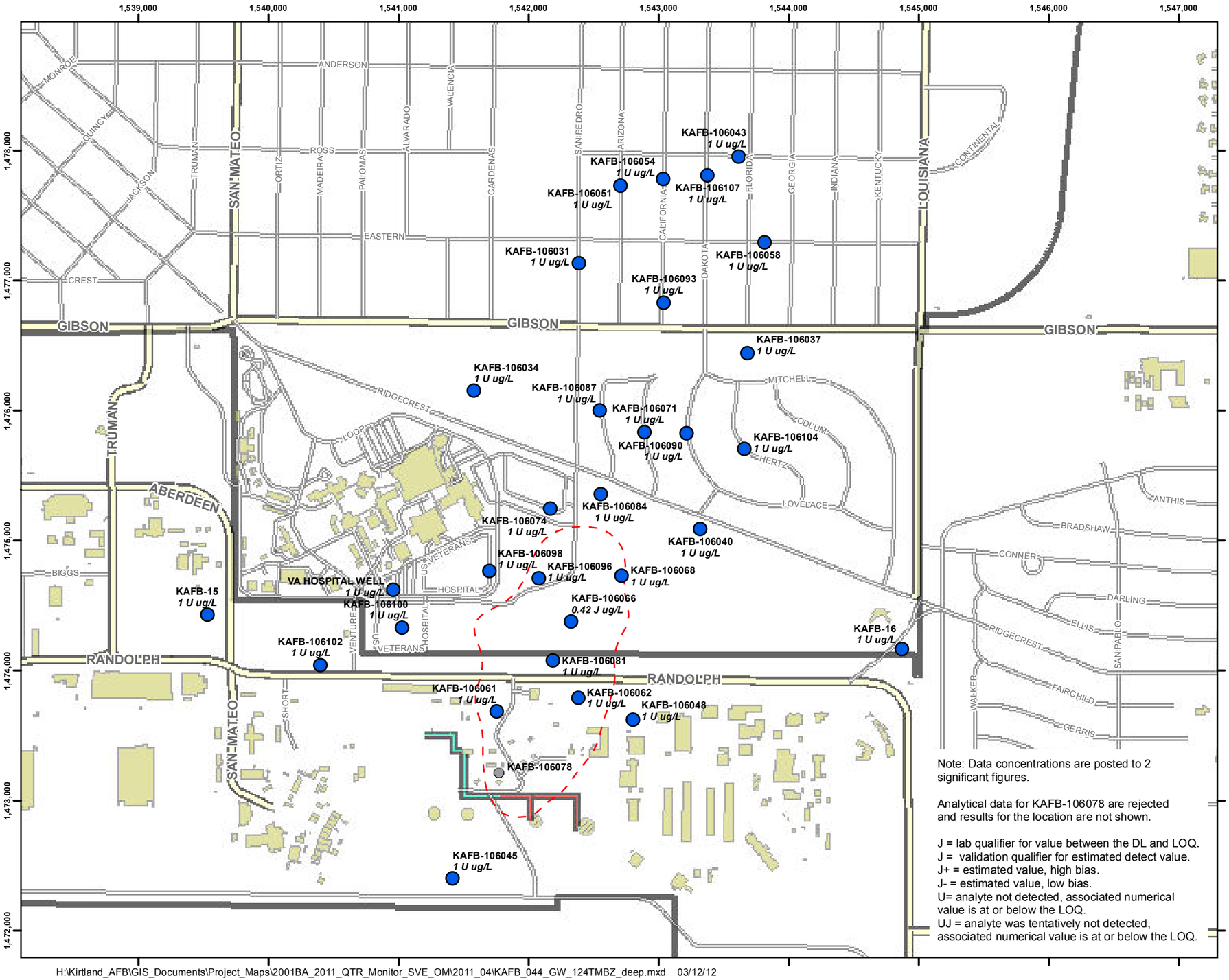


Note: Data concentrations are posted to 2 significant figures.

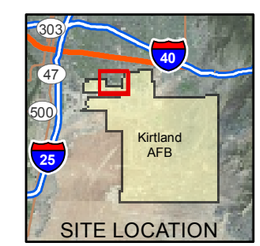
Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

Legend

1,2,4-Trimethylbenzene Result (ug/L)

- 0.42 - 1.0
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

0 400 800 1,600

Feet
1 inch = 800 feet

Revision Date: 03/12/12

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-35

1,2,4-TRIMETHYLBENZENE CONCENTRATIONS IN DEEP GROUNDWATER

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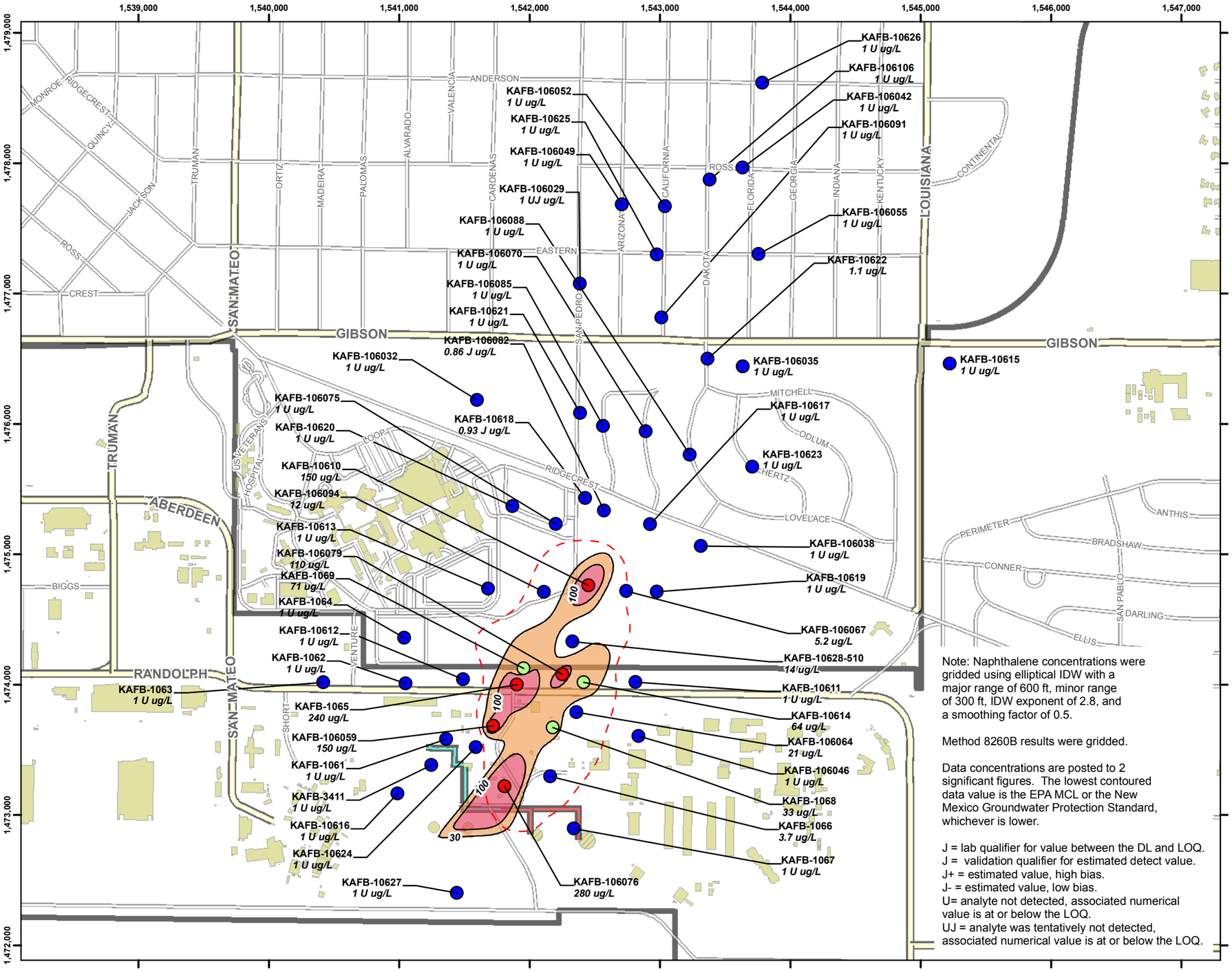


Note: Naphthalene concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2.8, and a smoothing factor of 0.5.

Method 8260B results were gridded.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is the EPA MCL or the New Mexico Groundwater Protection Standard, whichever is lower.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

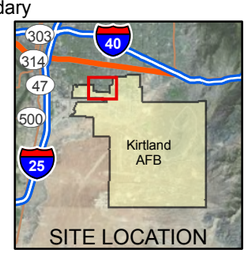
Legend

Naphthalene Result (ug/L)

- 0.86 - 30
- 31 - 100
- 110 - 280
- Historical Area of Observed NAPL (July 2009)
- Naphthalene Concentration Contour (ug/L)

Naphthalene Concentration (ug/L)

- 0.5 - 30
- 30 - 100
- 100 - 280
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

0 400 800 1,600
Feet
1 inch = 800 feet

Revision Date: 02/24/12

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-36

NAPHTHALENE CONCENTRATIONS IN SHALLOW GROUNDWATER

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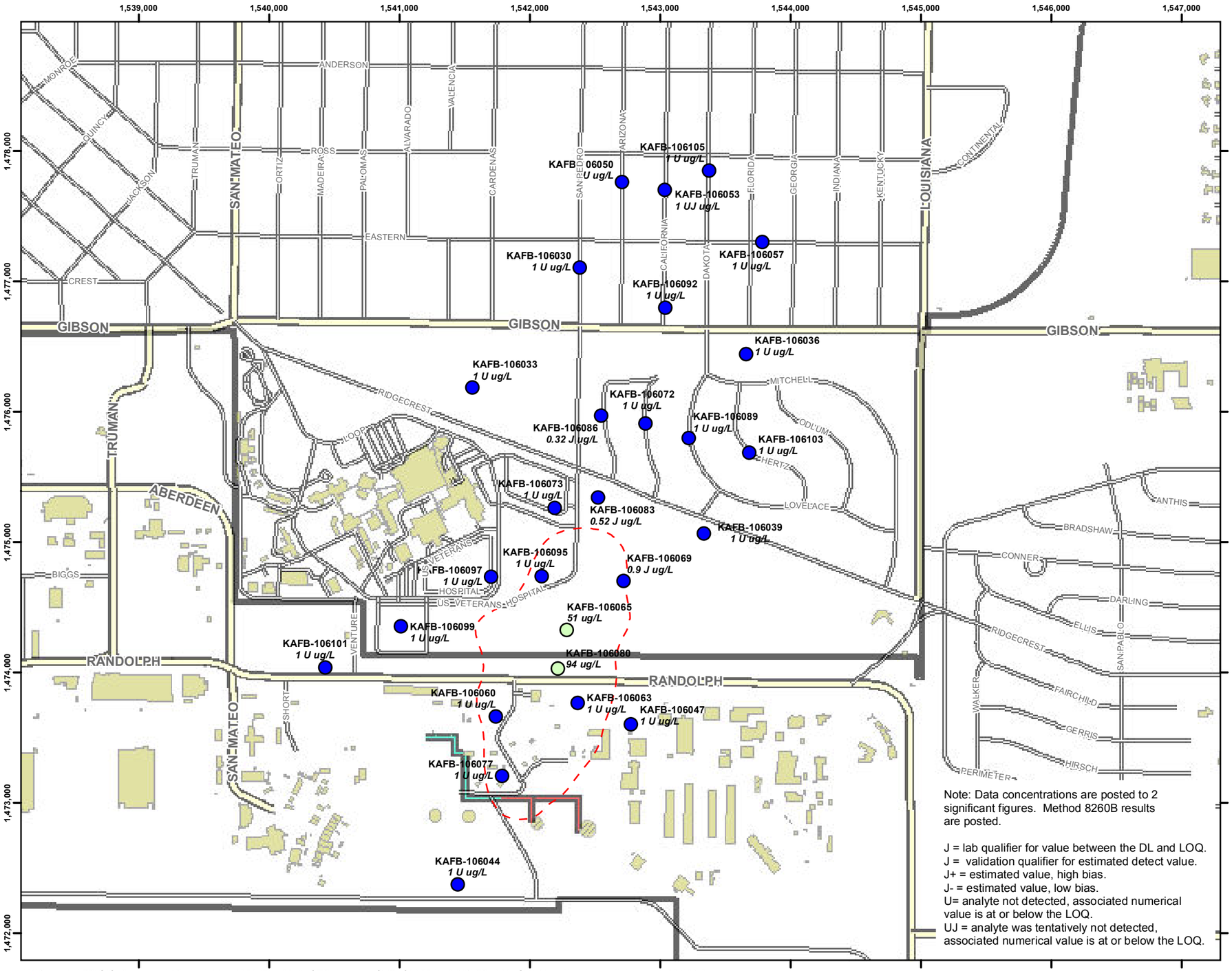
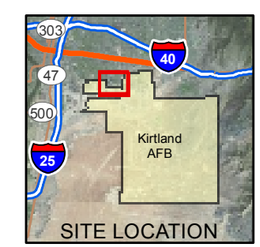


Legend

Naphthalene Result (ug/L)

- 0.32 - 30
- 31 - 100
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 03/12/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures. Method 8260B results are posted.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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FIGURE 5-37

NAPHTHALENE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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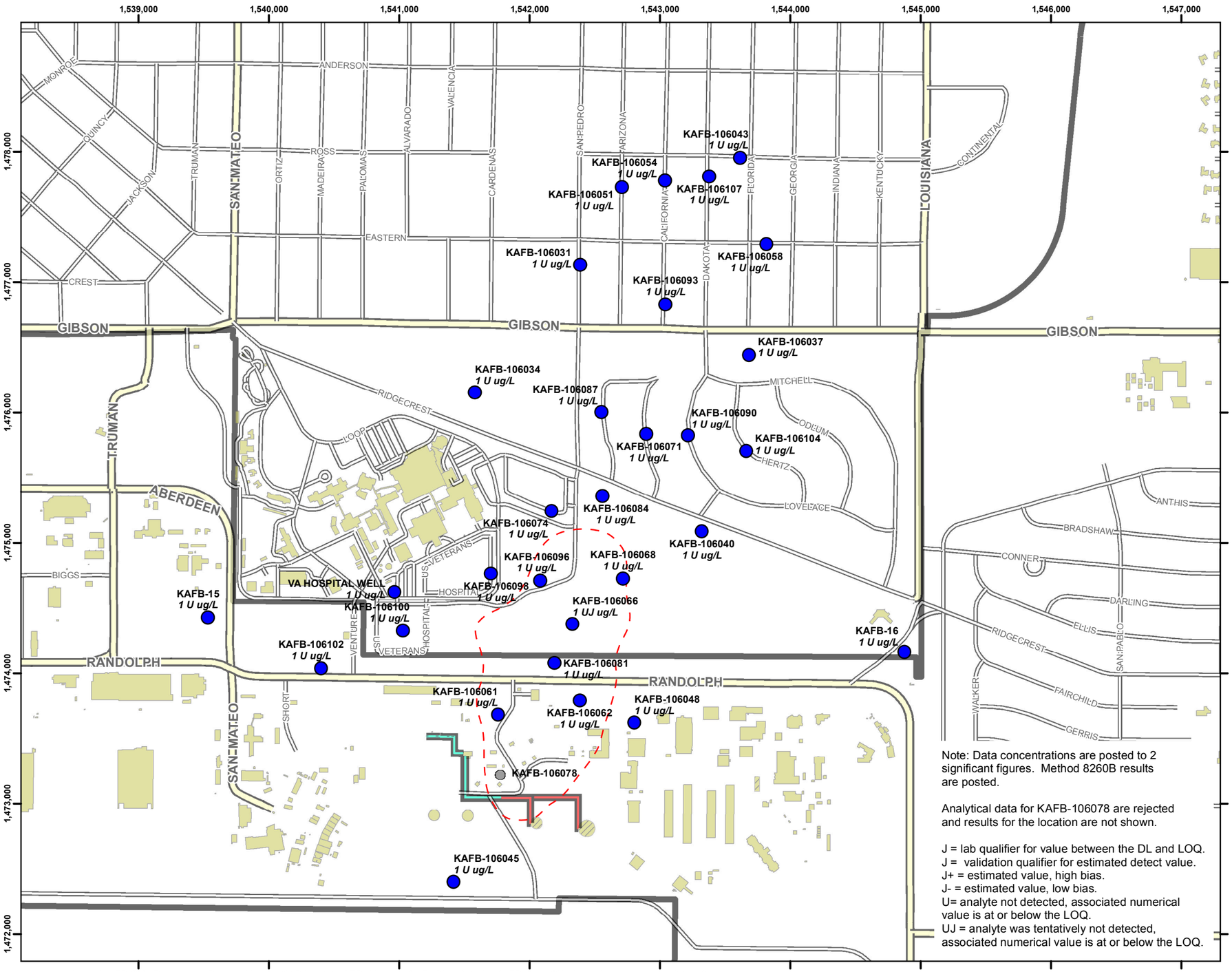
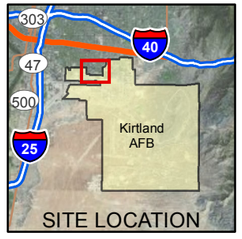


Legend

Naphthalene Result (ug/L)

- 0.19 - 30
- 31 - 100
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/12/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

Note: Data concentrations are posted to 2 significant figures. Method 8260B results are posted.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

J = lab qualifier for value between the DL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U= analyte not detected, associated numerical value is at or below the LOQ.
UJ = analyte was tentatively not detected, associated numerical value is at or below the LOQ.

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BULK FUELS FACILITY
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FIGURE 5-38

NAPHTHALENE CONCENTRATIONS IN DEEP GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_047_GW_Naphth_deep.mxd 03/12/12

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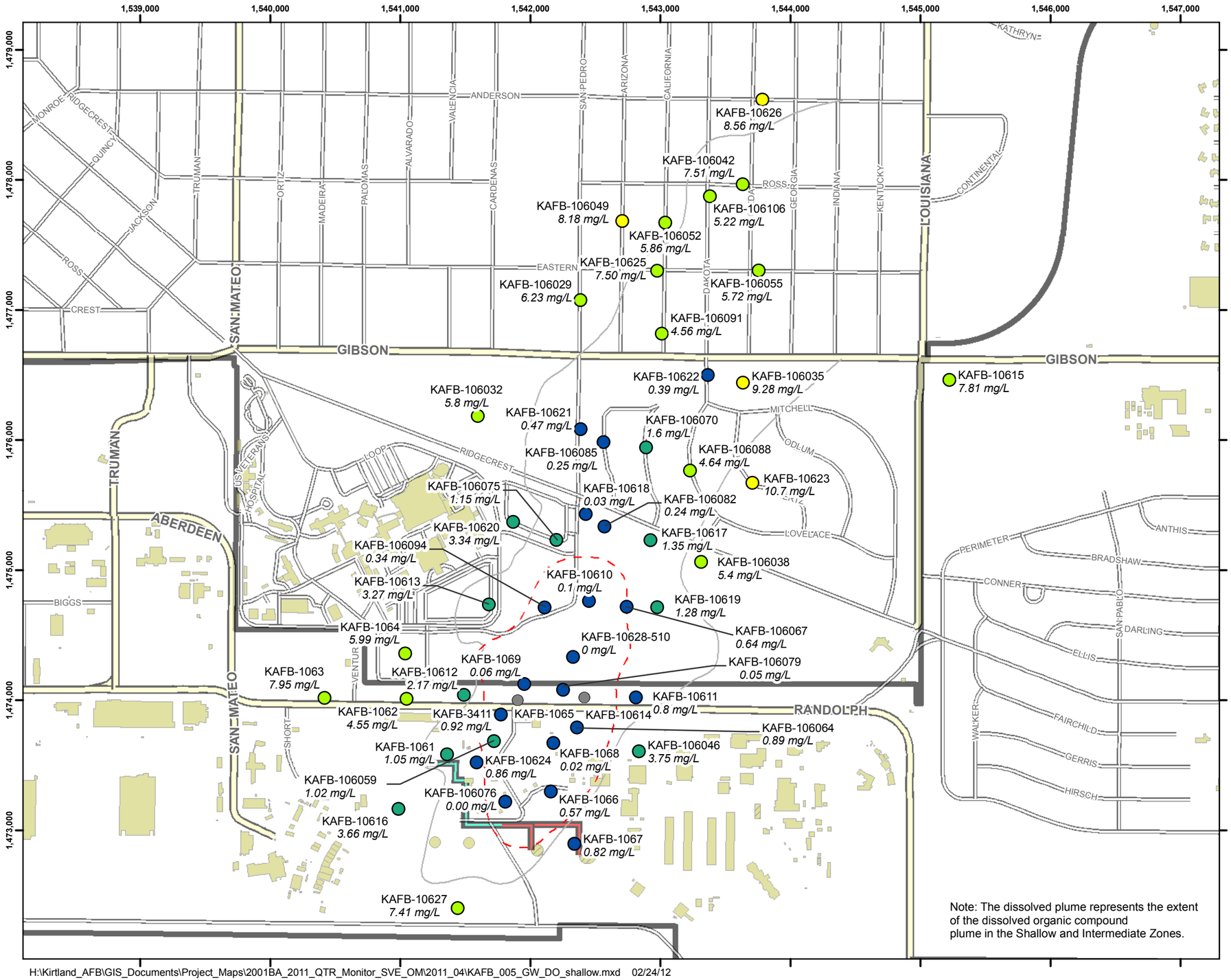


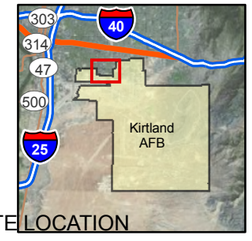
Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

Legend

Dissolved Oxygen (mg/L)

Shallow Groundwater

- 0.00 - 1.00
- 1.01 - 4.00
- 4.01 - 8.00
- 8.01 - 12.00
- 12.01 - 21.00
- Not recorded due to equipment malfunction or failure
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



SITE LOCATION

Revision Date: 02/24/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-39

DISSOLVED OXYGEN CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_005_GW_DO_shallow.mxd 02/24/12

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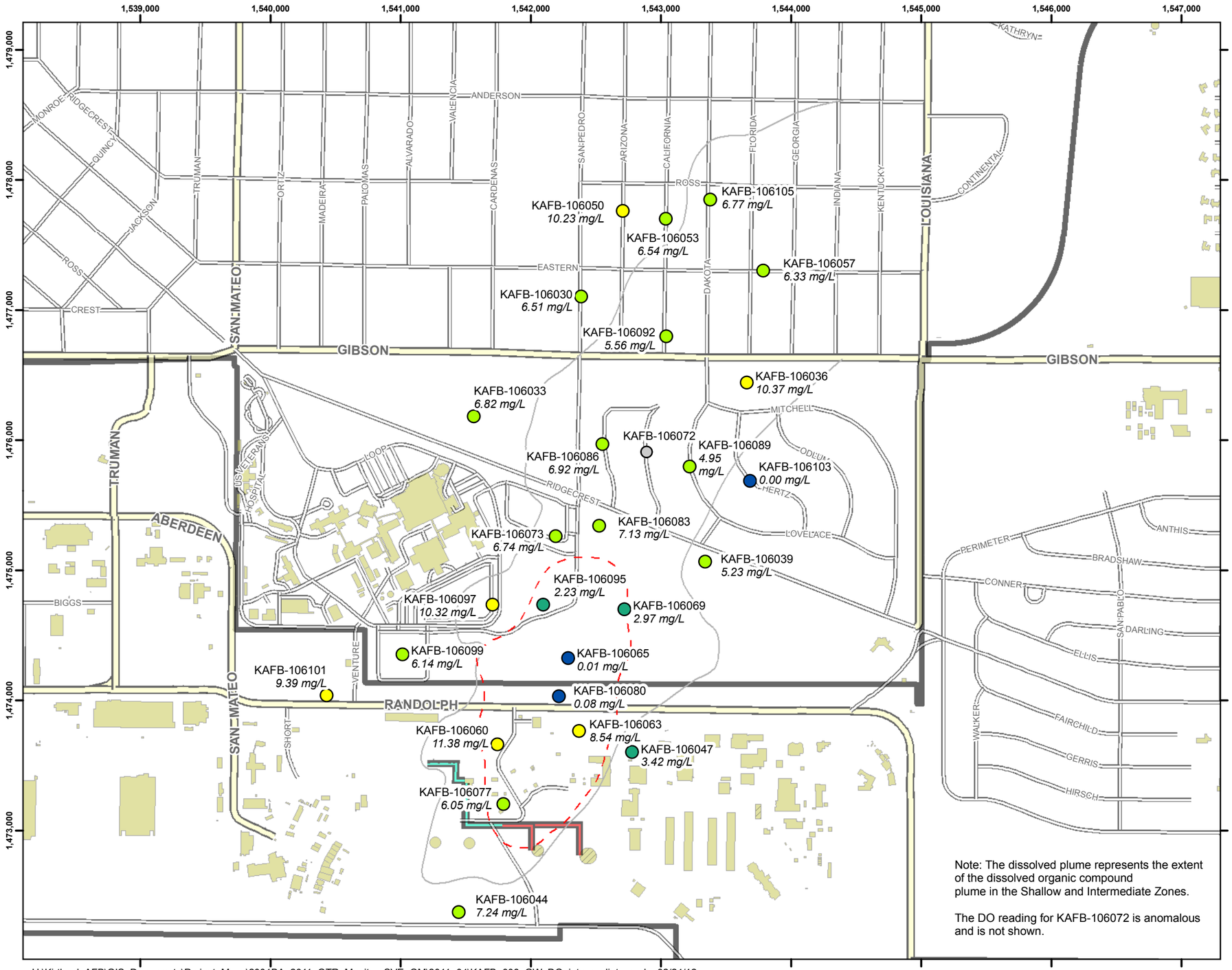


Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

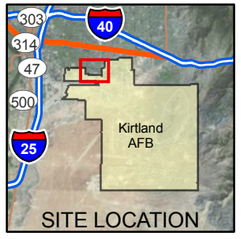
The DO reading for KAFB-106072 is anomalous and is not shown.

Legend

Dissolved Oxygen (mg/L)

Intermediate Groundwater

- 0.00 - 1.00
- 1.01 - 4.00
- 4.01 - 8.00
- 8.01 - 12.00
- > 12.00
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 02/24/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-40

DISSOLVED OXYGEN CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_006_GW_DO_intermediate.mxd 02/24/12

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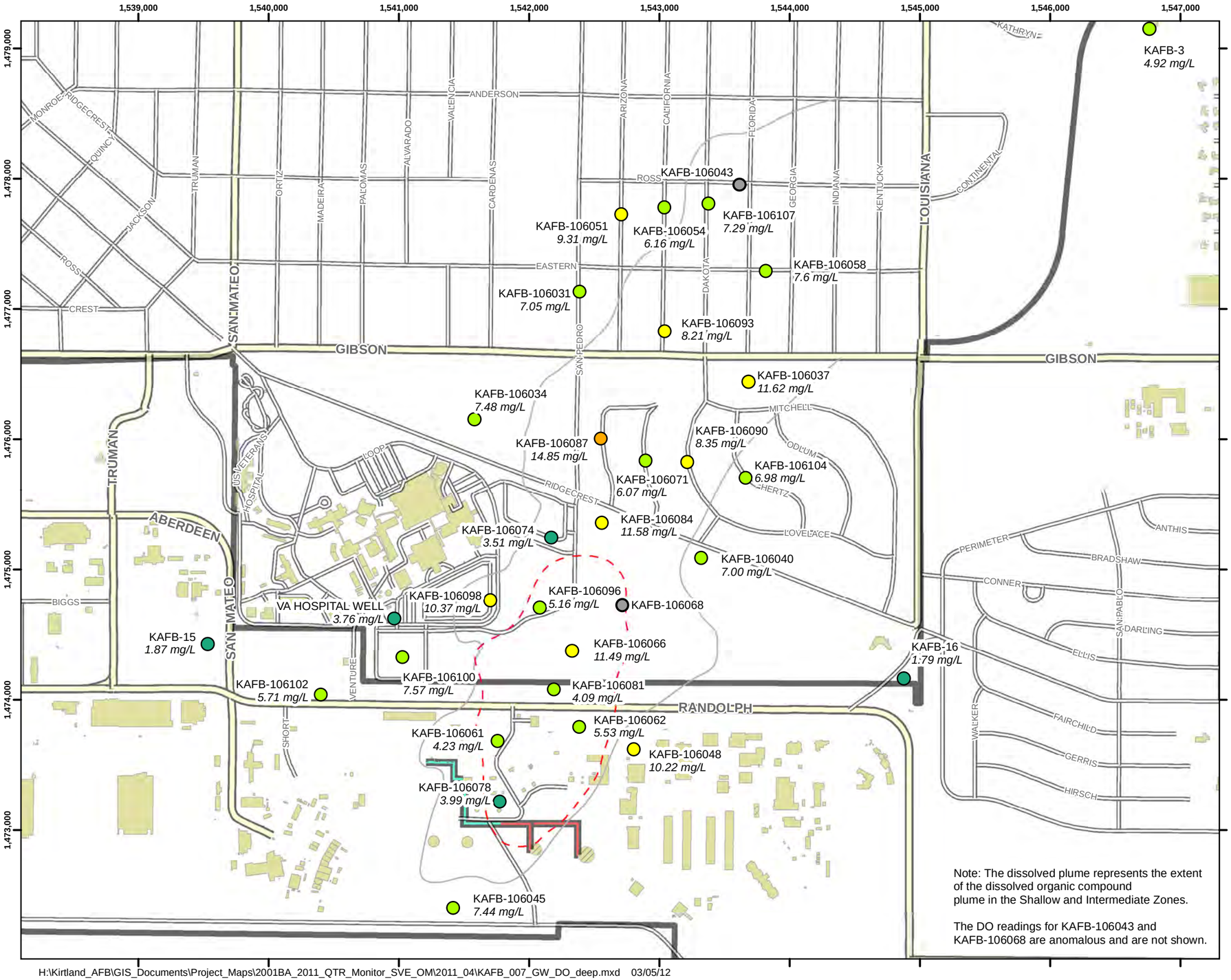


Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

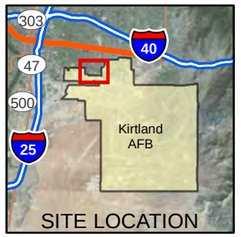
The DO readings for KAFB-106043 and KAFB-106068 are anomalous and are not shown.

Legend

Dissolved Oxygen (mg/L)

Deep Groundwater

- 0.00 - 1.00
- 1.00 - 4.00
- 4.01 - 8.00
- 8.01 - 12.00
- > 12.01
- Anomalous reading
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 03/05/12

N

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-41

DISSOLVED OXYGEN CONCENTRATIONS IN DEEP GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_007_GW_DO_deep.mxd 03/05/12

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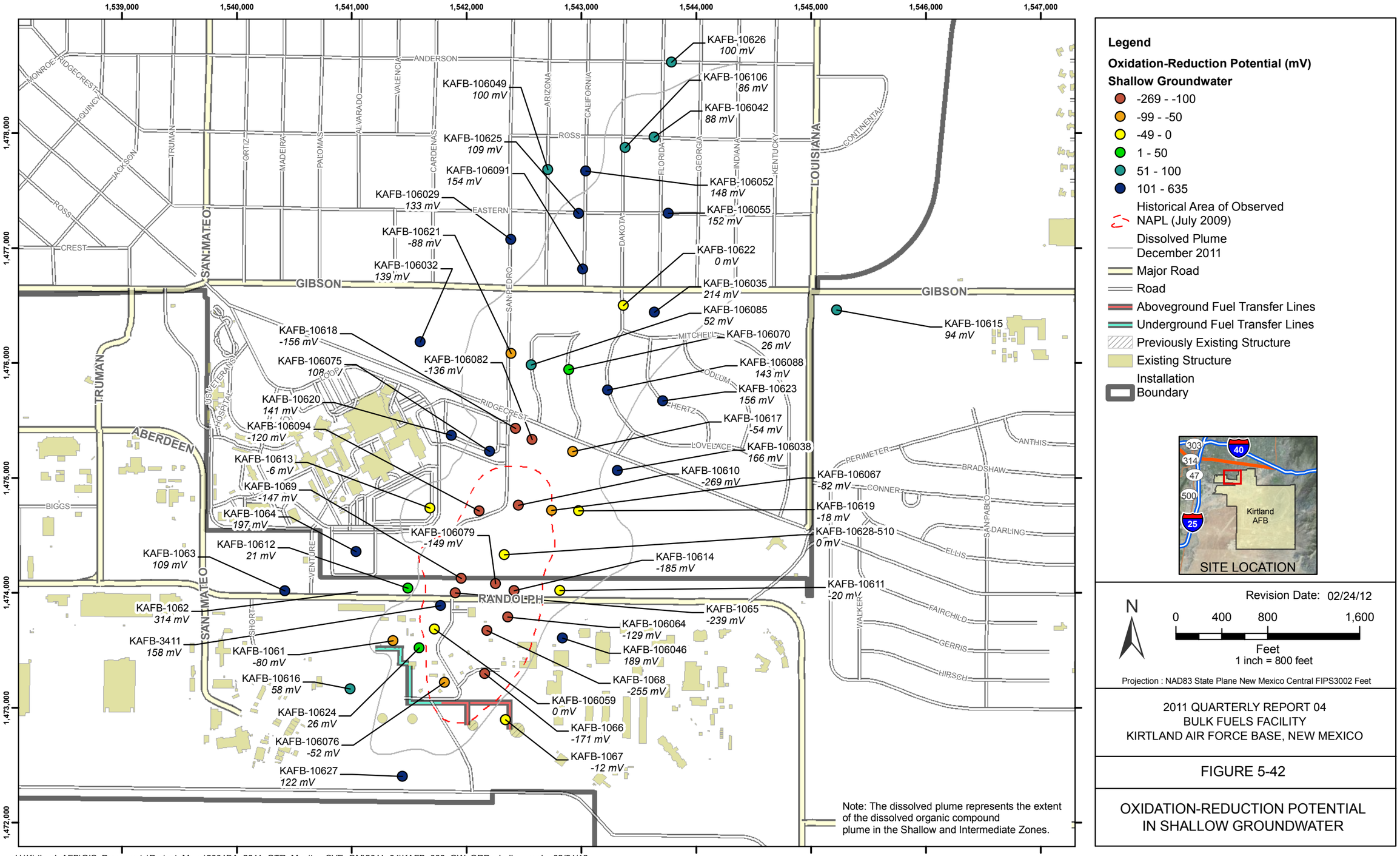

Legend

Oxidation-Reduction Potential (mV)

Shallow Groundwater

- -269 - -100
- -99 - -50
- -49 - 0
- 1 - 50
- 51 - 100
- 101 - 635
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary

N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-42

OXIDATION-REDUCTION POTENTIAL IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_008_GW_ORP_shallow.mxd 02/24/12

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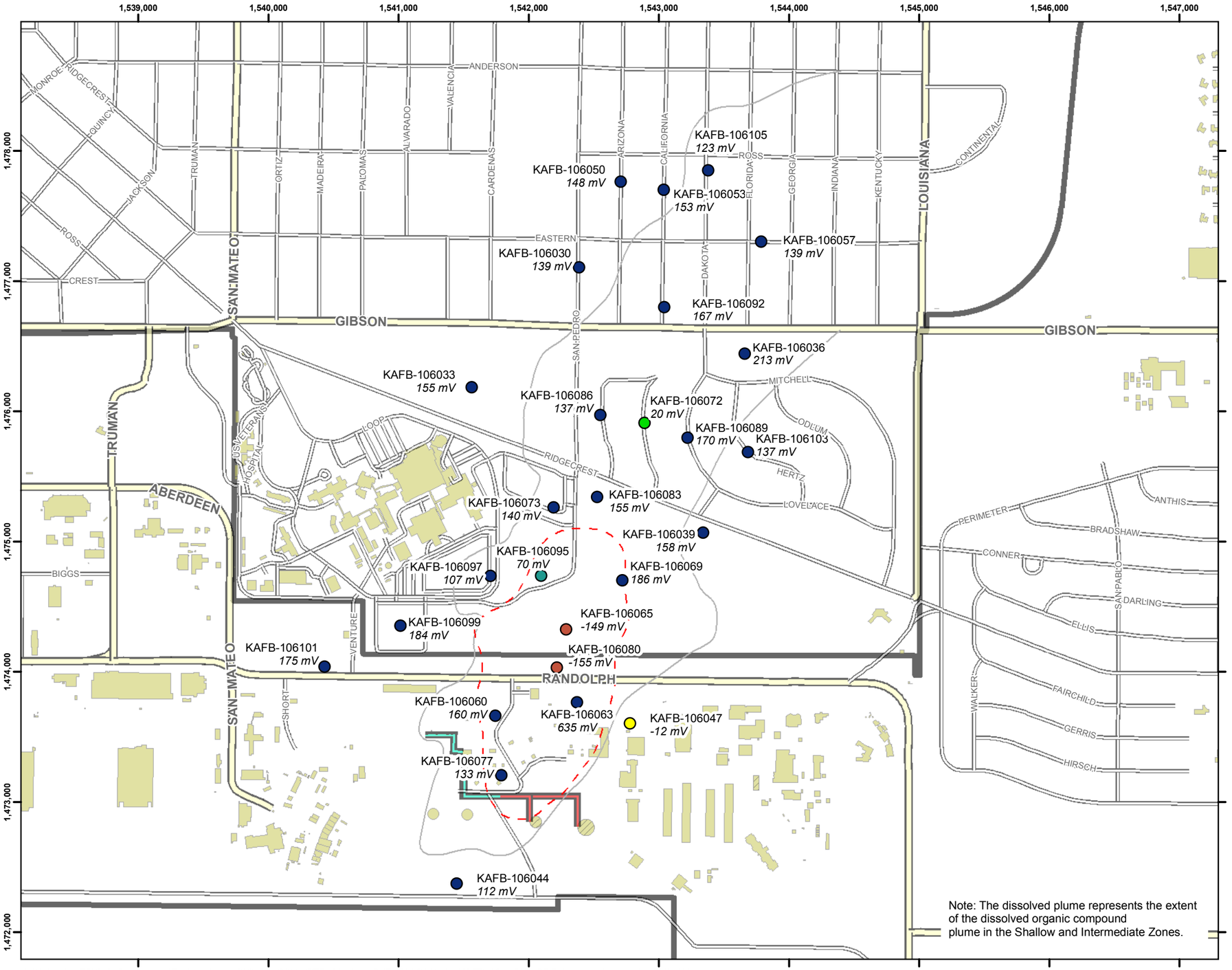


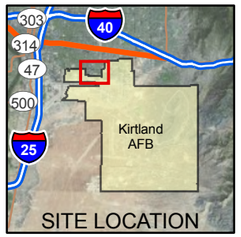
Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

Legend

Oxidation-Reduction Potential (mV)

Intermediate Groundwater

- -269 - -100
- -99 - -50
- -49 - 0
- 1 - 50
- 51 - 100
- 101 - 635
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-43

OXIDATION-REDUCTION POTENTIAL IN INTERMEDIATE GROUNDWATER

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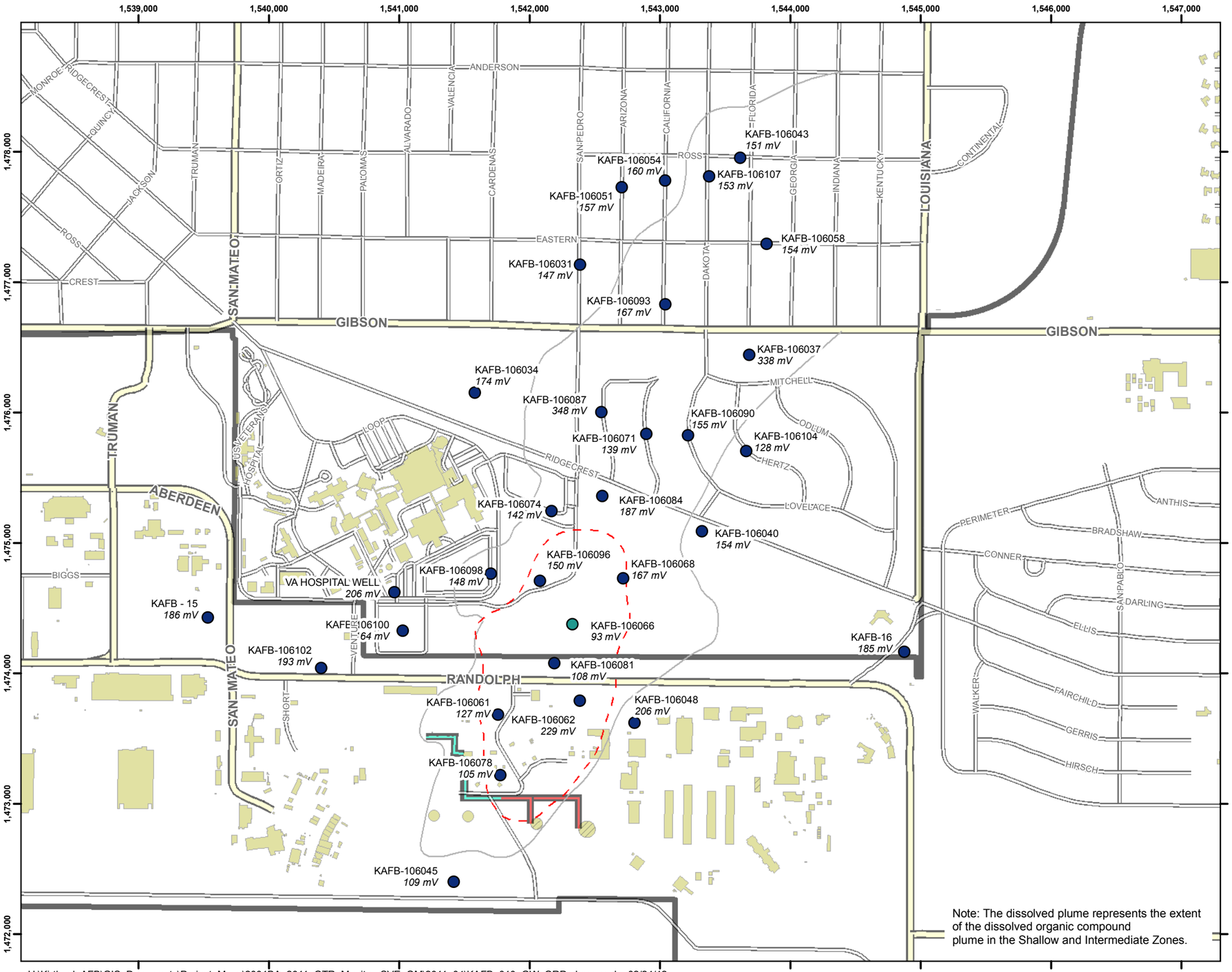
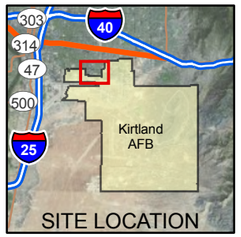


Legend

Oxidation-Reduction Potential (mV)

Deep Groundwater

- -269 - -100
- -99 - -50
- -49 - 0
- 1 - 50
- 51 - 100
- 101 - 635
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-44

OXIDATION-REDUCTION POTENTIAL IN DEEP GROUNDWATER

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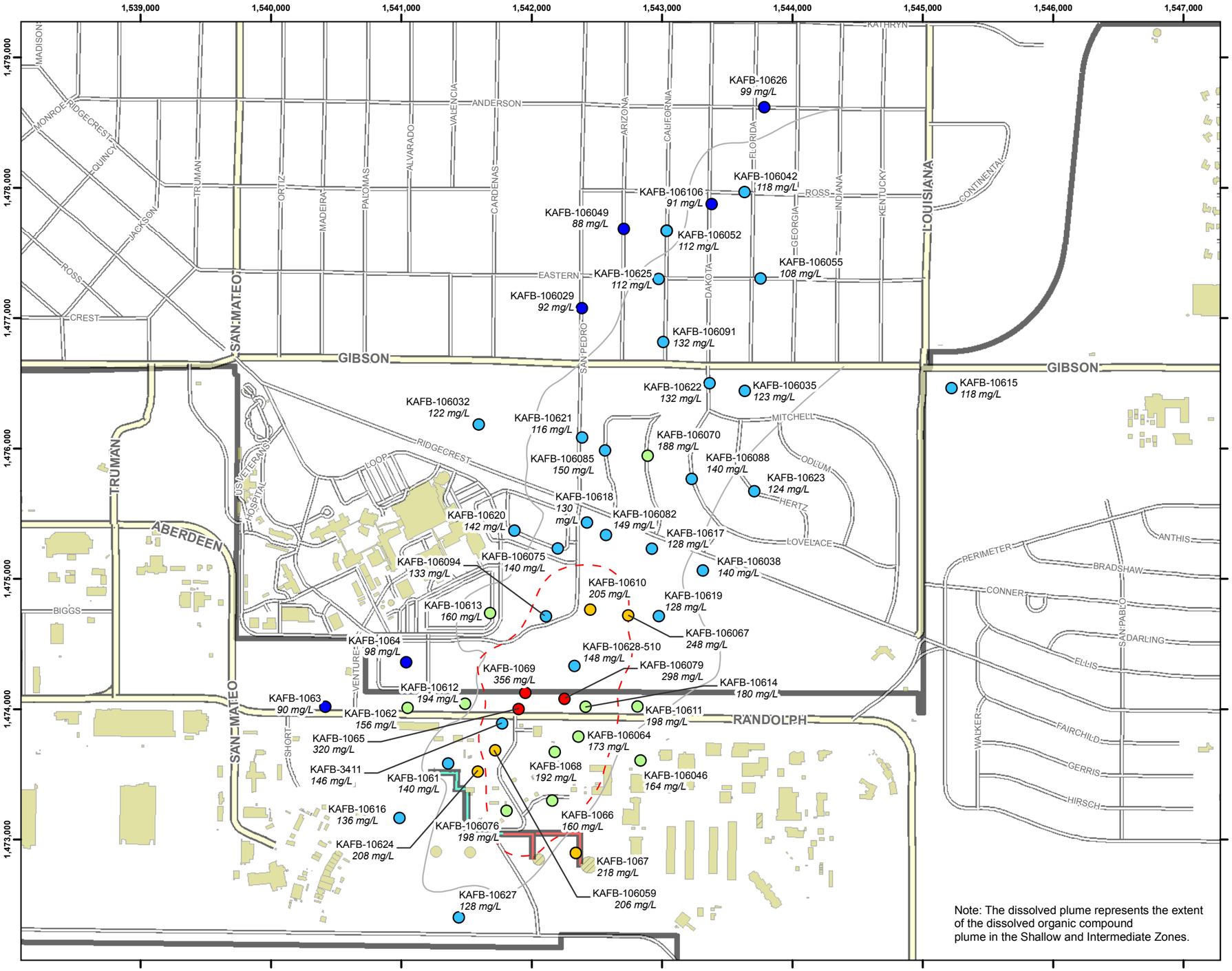


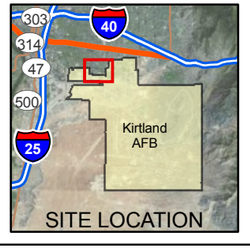
Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

Legend

Alkalinity (mg/L)

Shallow Groundwater

- 50 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 356
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-45

ALKALINITY, BICARBONATE (as $CaCO_3$), CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_011_GW_alkalinity_shallow.mxd 02/24/12

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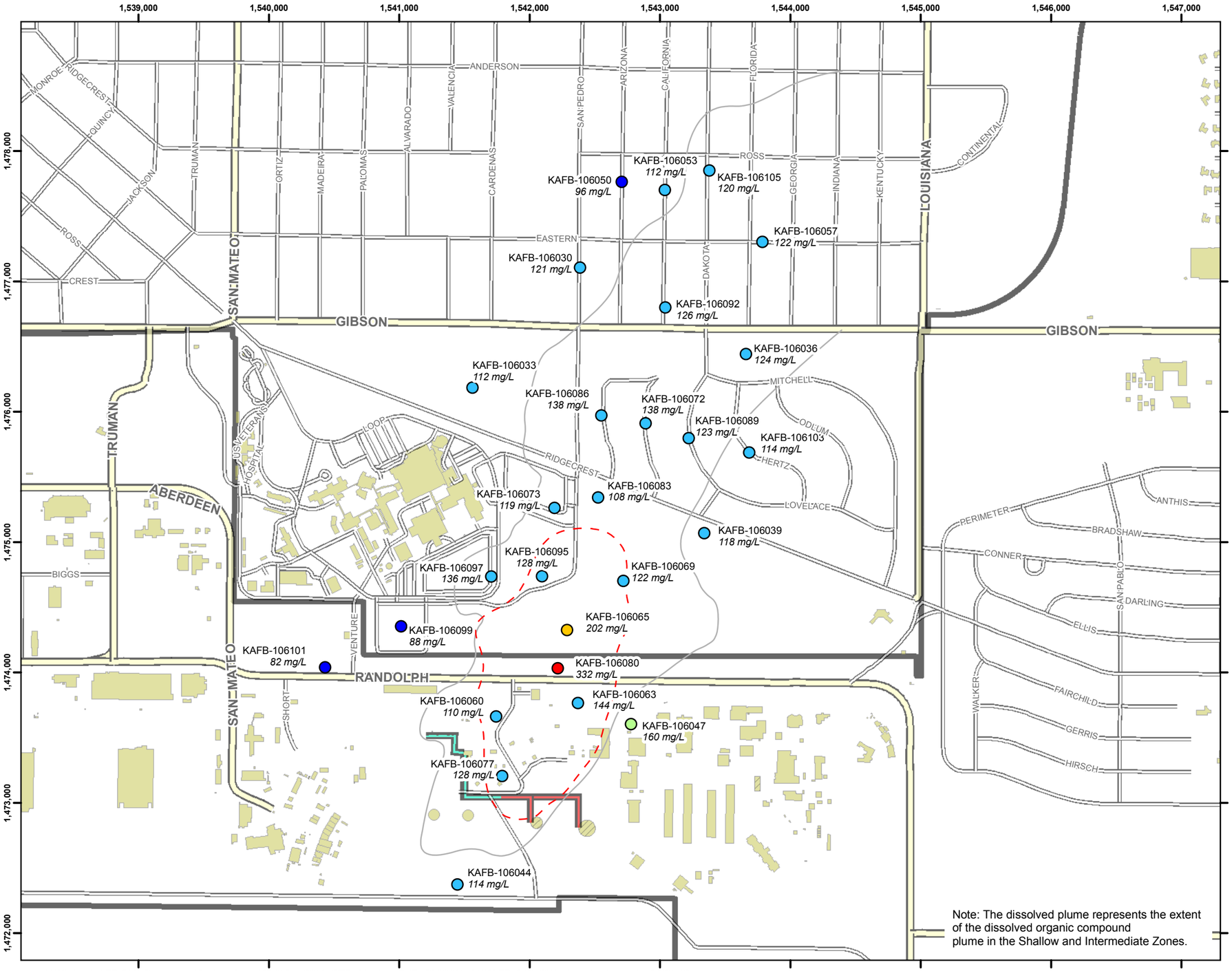


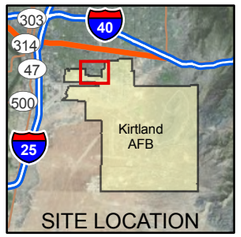
Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

Legend

Alkalinity (mg/L)

Intermediate Groundwater

- 50 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 356
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-46

ALKALINITY, BICARBONATE (as $CaCO_3$), CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_012_GW_alkalinity_int.mxd 02/24/12

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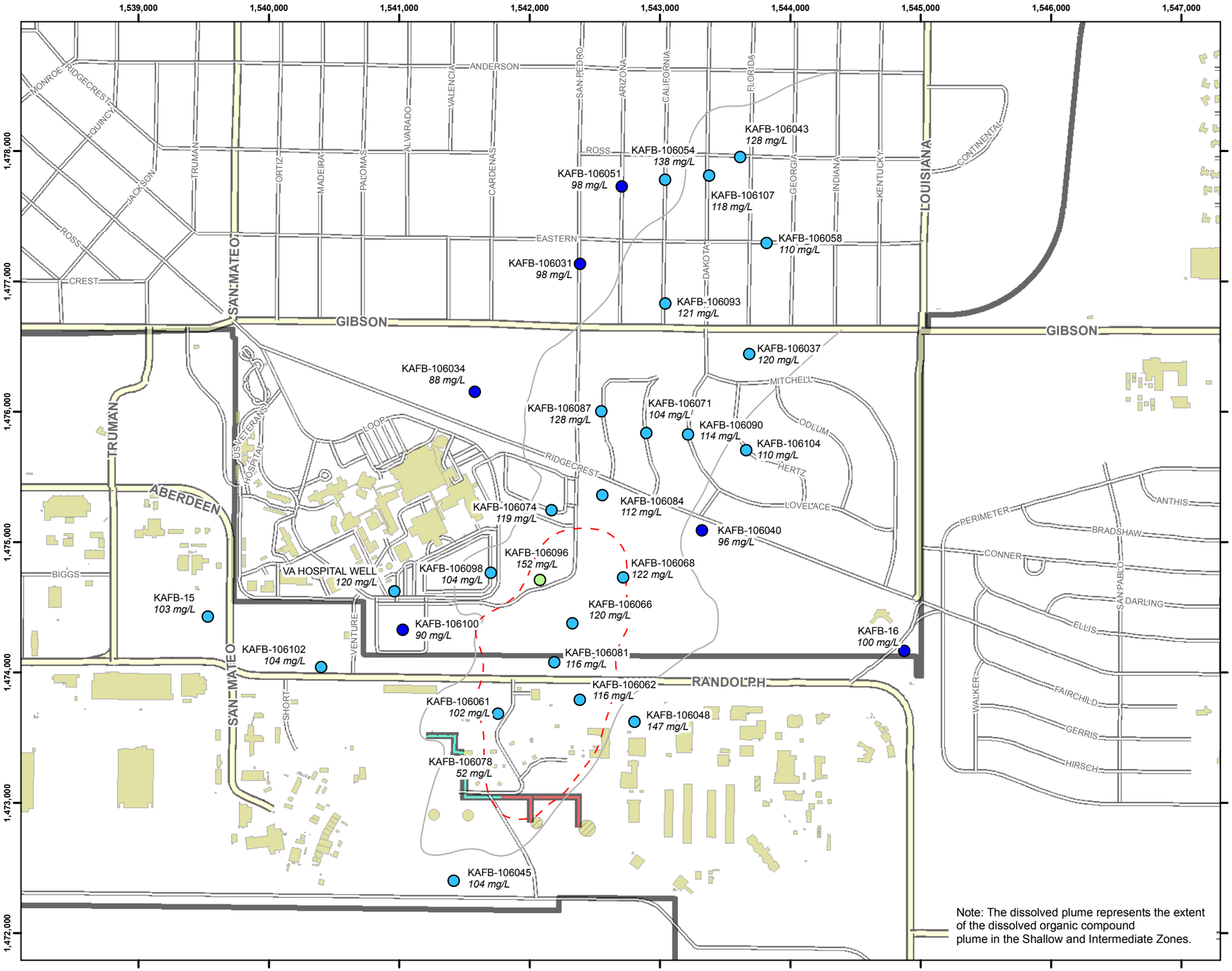


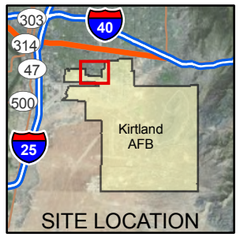
Note: The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

Legend

Alkalinity (mg/L)

Deep Groundwater

- 50 - 100
- 101 - 150
- 151 - 200
- 201 - 250
- 251 - 356
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600

Feet

1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

2011 QUARTERLY REPORT 04
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FIGURE 5-47

ALKALINITY, BICARBONATE (as $CaCO_3$), CONCENTRATIONS IN DEEP GROUNDWATER

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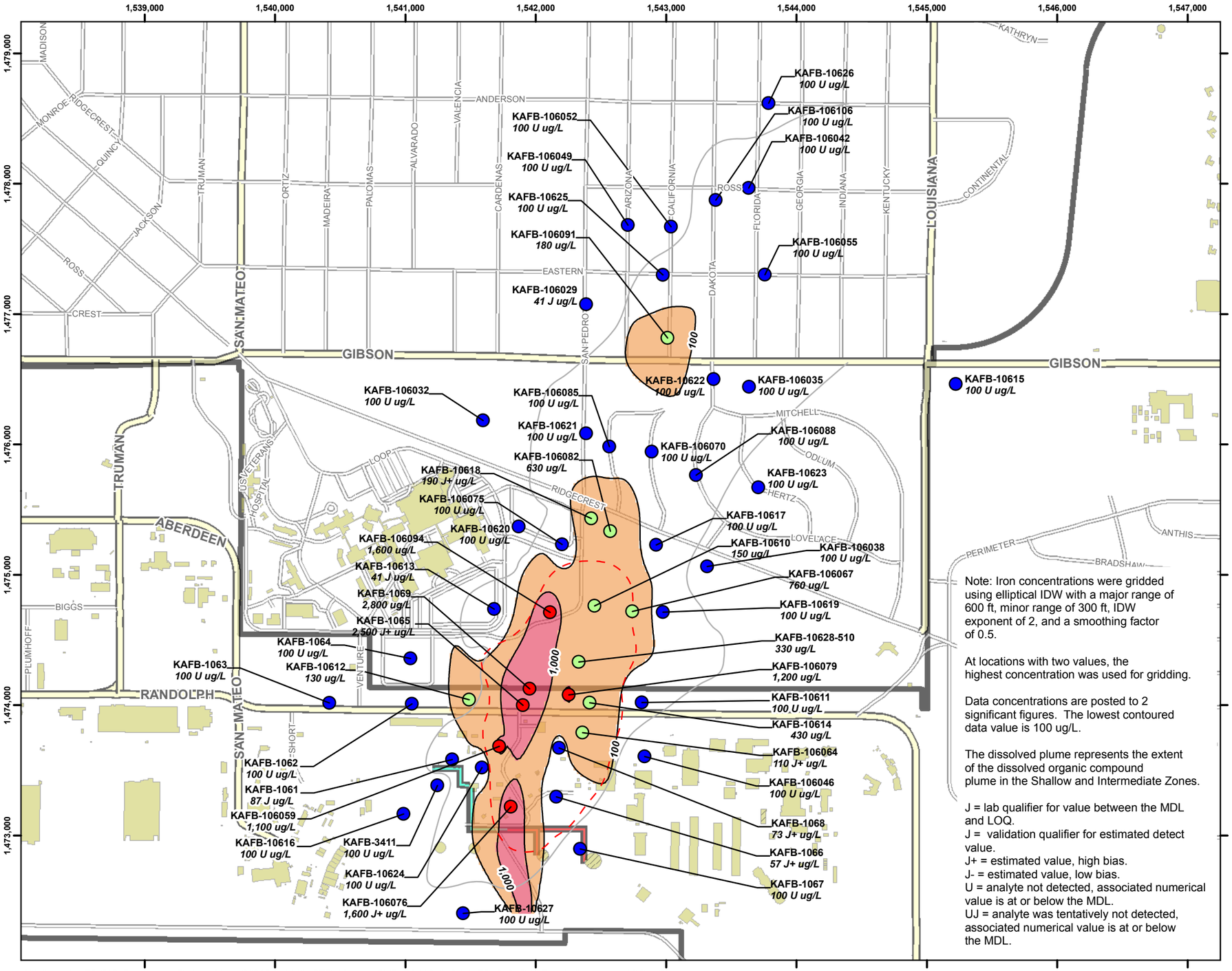


Note: Iron concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 100 ug/L.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

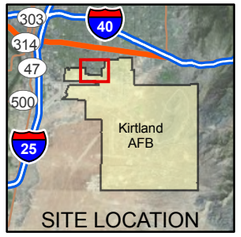
J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Legend

Iron Result (ug/L)
- 41 - 100
- 110 - 1,000
- 1,100 - 2,800
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Iron Concentration Contour (ug/L)

Iron Concentration (ug/L)
- 41- 100
- 100 - 1,000
- 1,000 - 2,786

- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



N

Revision Date: 02/24/12

0 400 800 1,600
Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-48

IRON CONCENTRATIONS
IN SHALLOW GROUNDWATER

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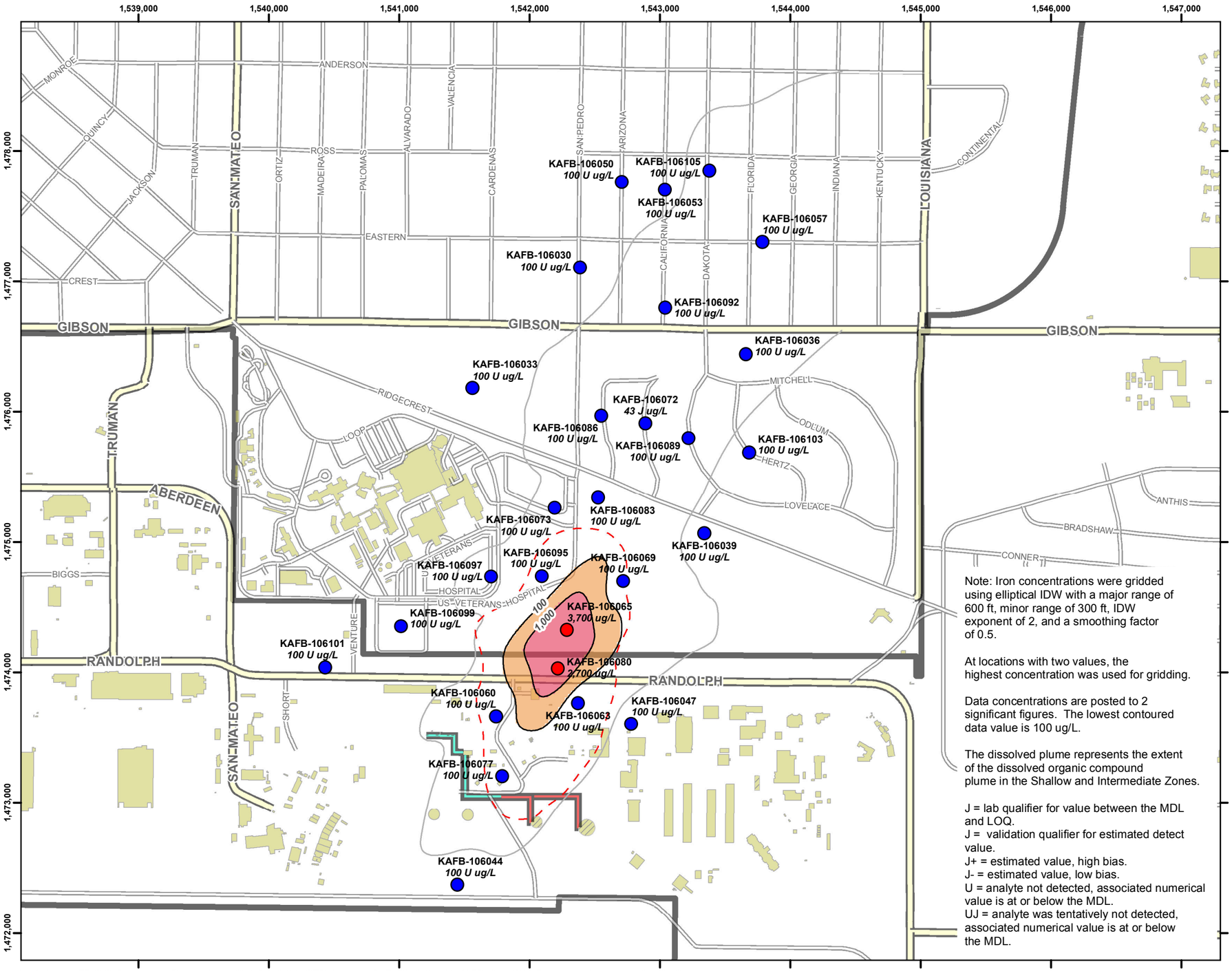
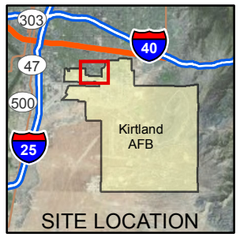


Legend

Iron Result (ug/L)
- 43 - 100
- 110 - 1,000
- 1,100 - 3,700
- Iron Concentration Contour (ug/L)

Iron Concentration (ug/L)
- 42- 100
- 100 - 1,000
- 1,000 - 2,647
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Iron concentrations were gridded using elliptical IDW with a major range of 600 ft, minor range of 300 ft, IDW exponent of 2, and a smoothing factor of 0.5.

At locations with two values, the highest concentration was used for gridding.

Data concentrations are posted to 2 significant figures. The lowest contoured data value is 100 ug/L.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

N

Revision Date: 03/16/12

0 400 800 1,600
Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-49

IRON CONCENTRATIONS
IN INTERMEDIATE GROUNDWATER

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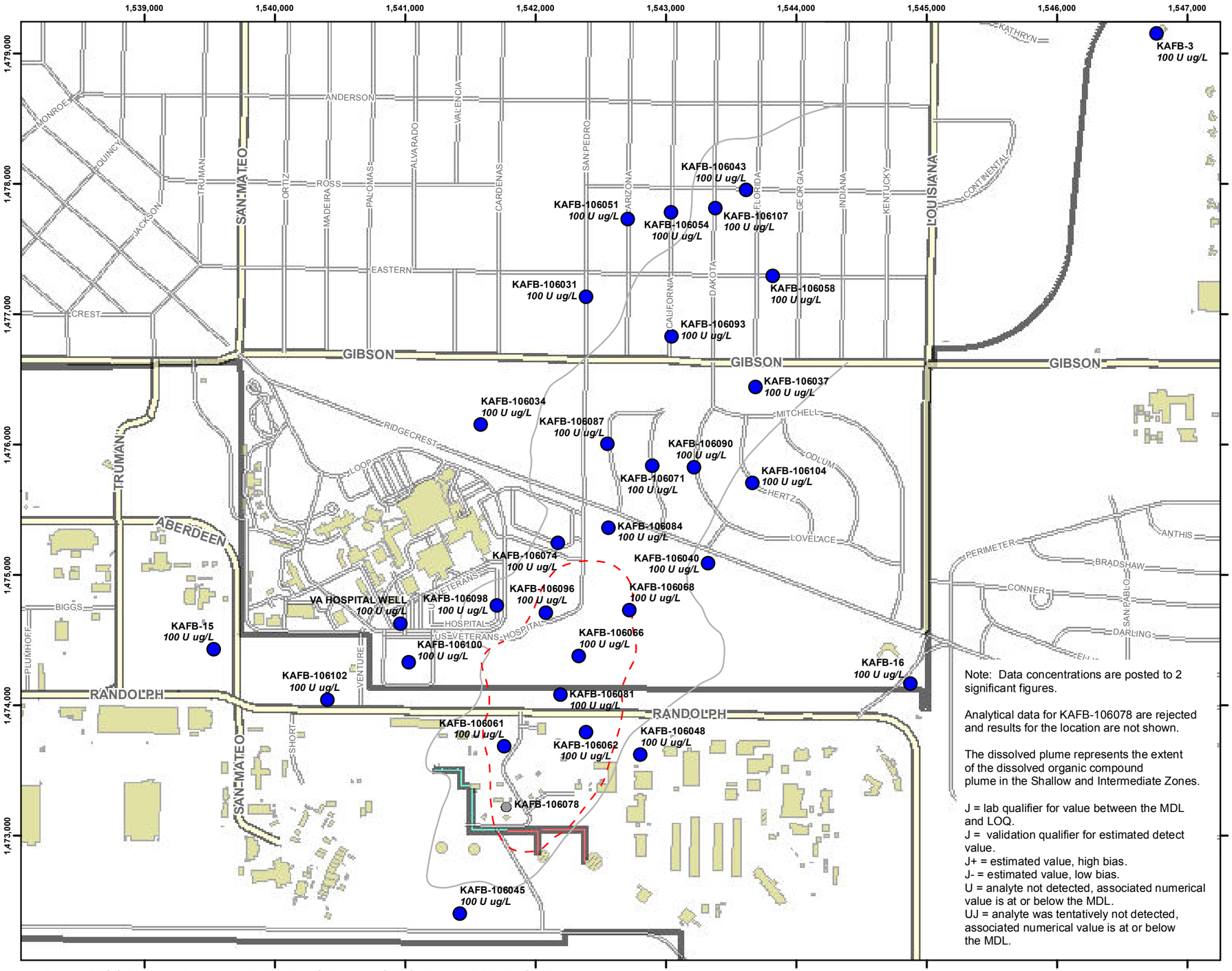
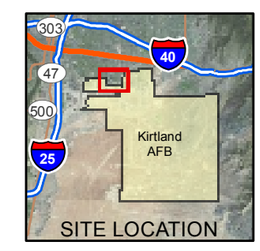


Legend

Iron Result (ug/L)

- 100
- 3,700
- Analytical Results Were Rejected
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

Analytical data for KAFB-106078 are rejected and results for the location are not shown.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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BULK FUELS FACILITY
KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-50

IRON CONCENTRATIONS
IN DEEP GROUNDWATER

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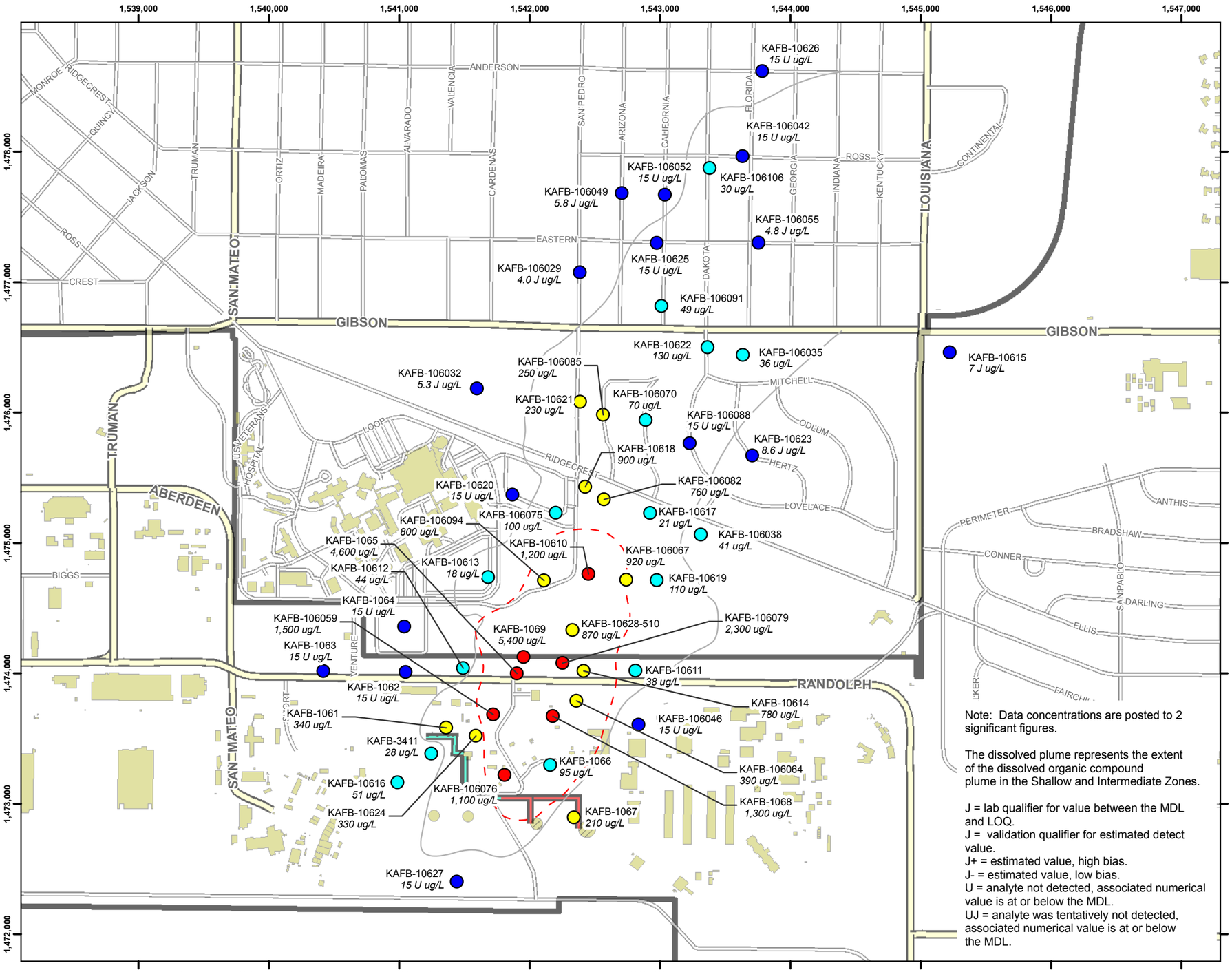


Note: Data concentrations are posted to 2 significant figures.

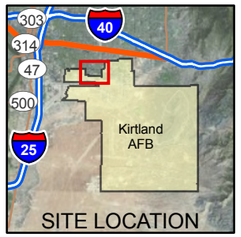
The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Legend

Manganese Result (ug/L)

- 3.9 - 15
- 16 - 200
- 210 - 1,000
- 1,100 - 5,400
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Revision Date: 02/24/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-51

MANGANESE CONCENTRATIONS IN SHALLOW GROUNDWATER

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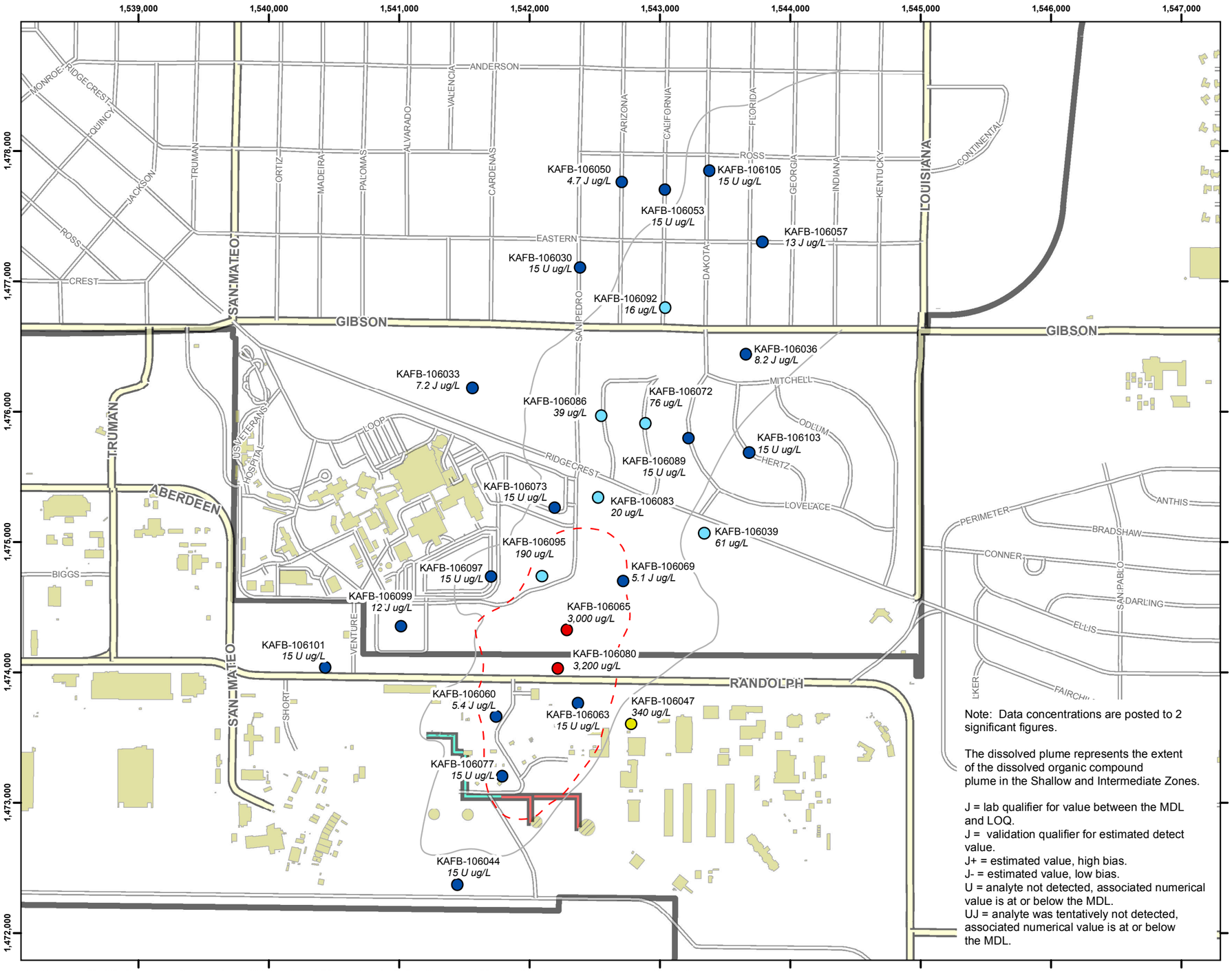
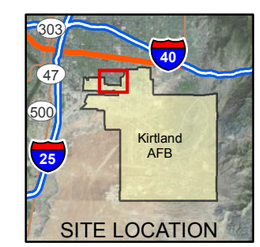


Legend

Manganese Result (ug/L)

- 4.7 - 15
- 16 - 200
- 210 - 1,000
- 1,000 - 3,200
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/16/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-52

MANGANESE CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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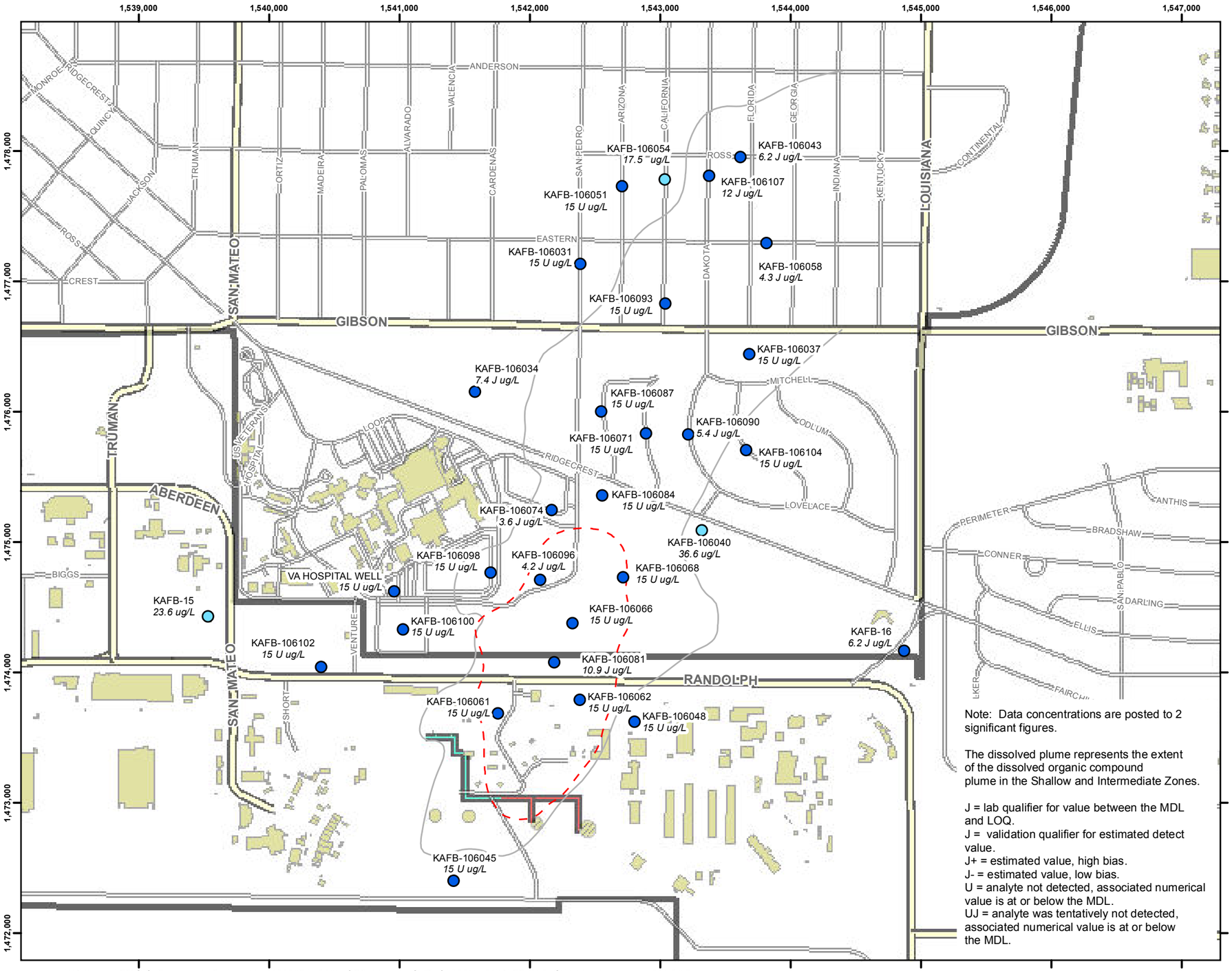
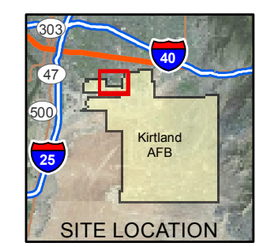


Legend

Manganese Result (ug/L)

- 3.6 - 15
- 16 - 200
- 201 - 1,000
- 1,000 - 3,030
- Historical Area of Observed NAPL (July 2009)
- Dissolved Plume December 2011
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
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J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-53

MANGANESE CONCENTRATIONS IN DEEP GROUNDWATER

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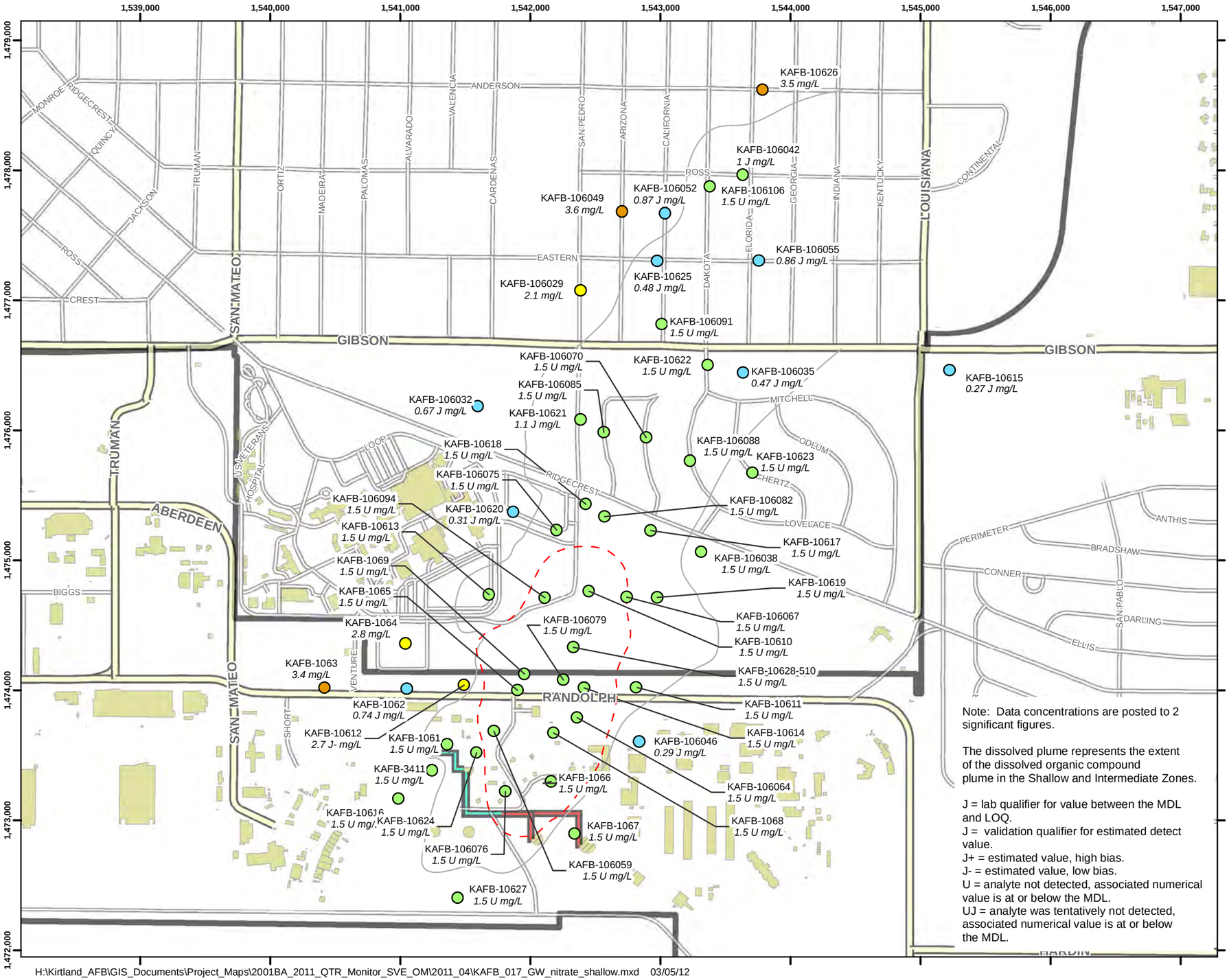
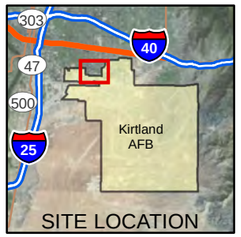


Legend

Nitrogen Result (mg/L)

- 0.27 - 1.0
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 3.6
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

N

Revision Date: 03/05/12

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-54

NITROGEN (NITRATE-NITRITE) CONCENTRATIONS IN SHALLOW GROUNDWATER

H:\Kirtland_AFB\GIS_Documents\Project_Maps\2001BA_2011_QTR_Monitor_SVE_OM\2011_04\KAFB_017_GW_nitrate_shallow.mxd 03/05/12

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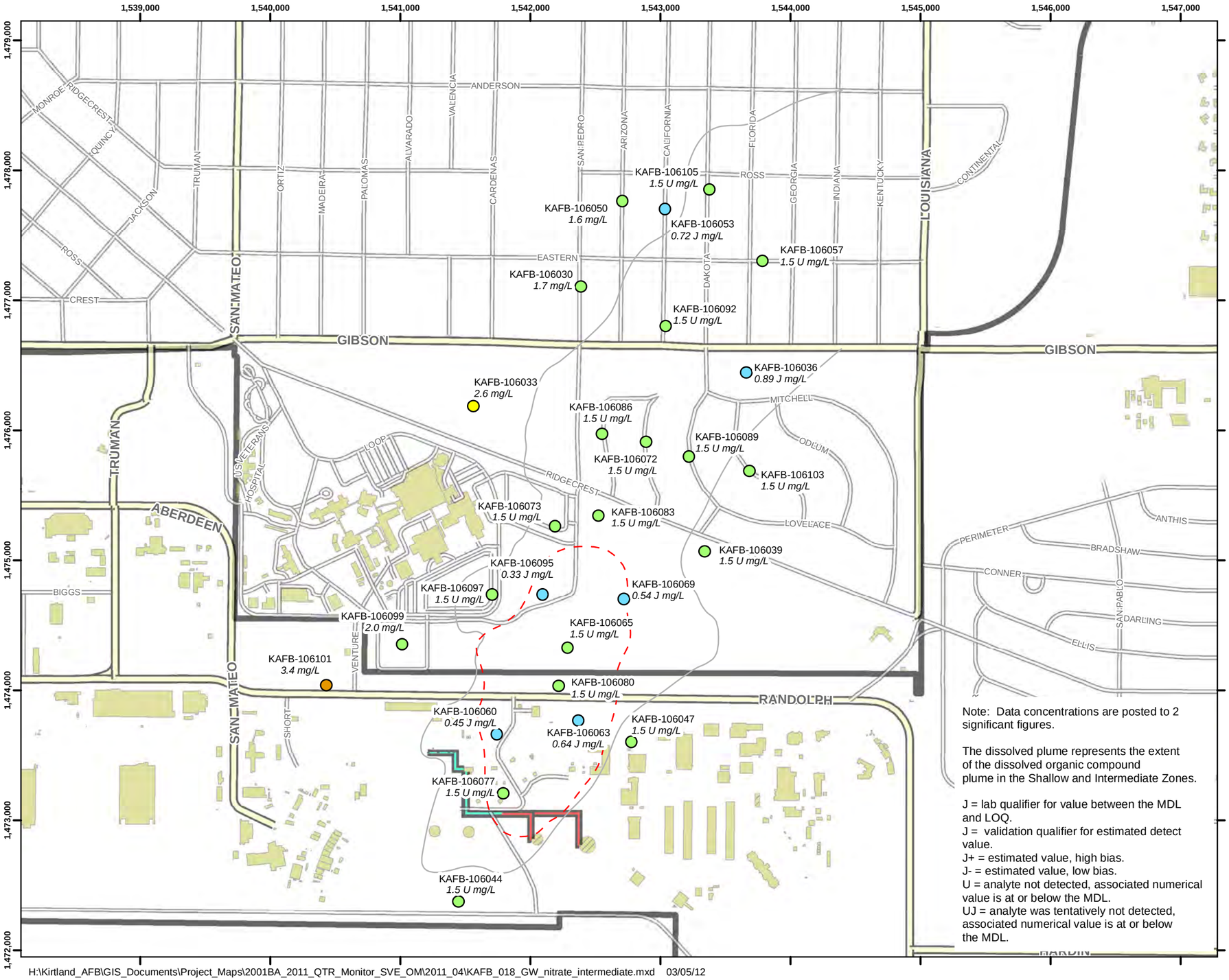
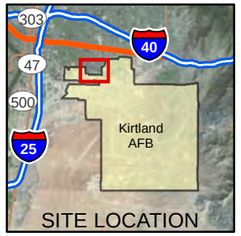


Legend

Nitrogen Result (mg/L)

- 0.33 - 1.00
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 3.4
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

N

0 400 800 1,600
Feet
1 inch = 800 feet

Revision Date: 03/05/12

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-55

NITROGEN (NITRATE-NITRITE) CONCENTRATIONS IN INTERMEDIATE GROUNDWATER

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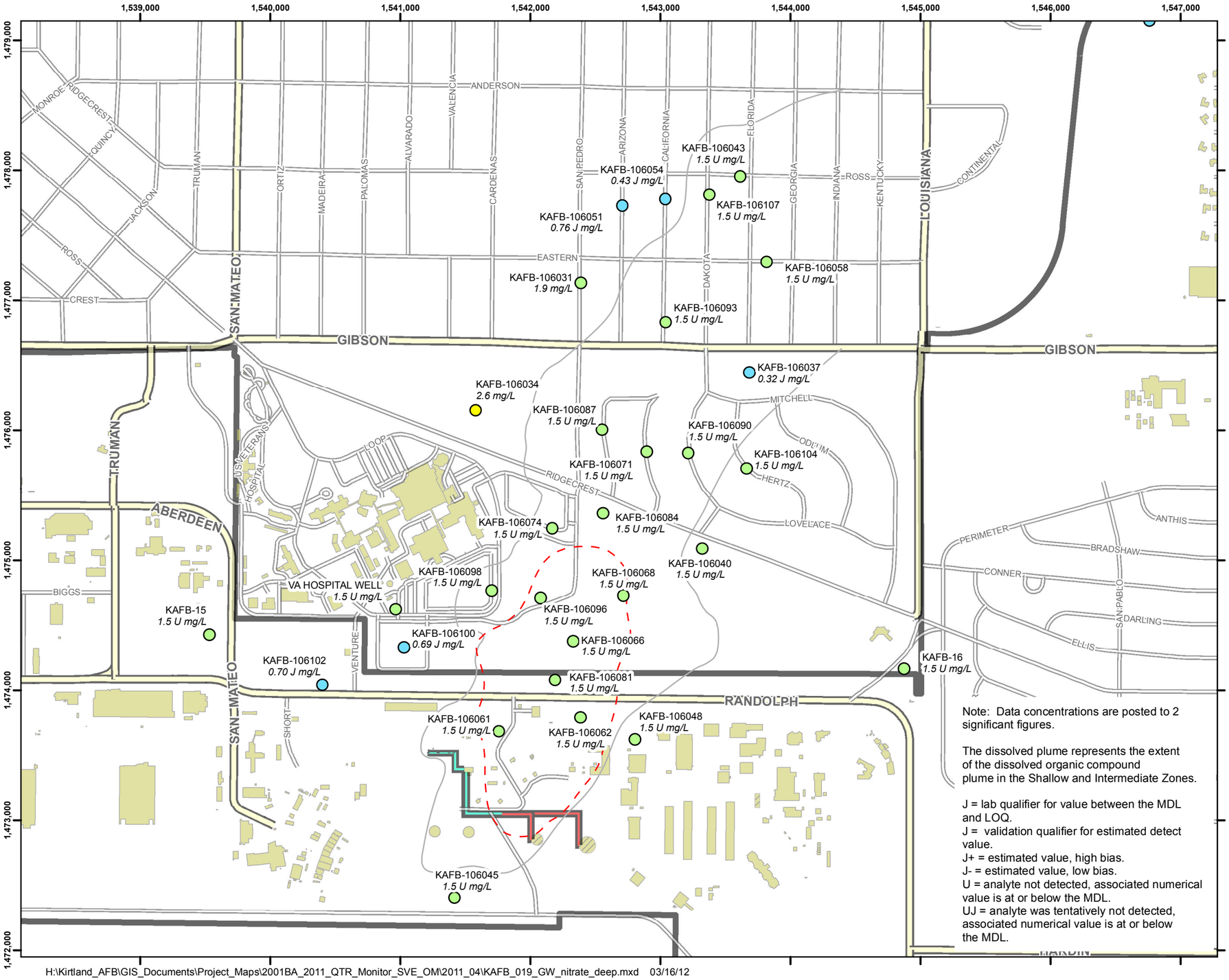

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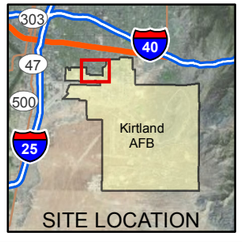
Legend

Nitrogen Result (mg/L)

- 0.32 - 1.0
- 1.1 - 2.0
- 2.1 - 2.6
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
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J- = estimated value, low bias.
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UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/16/12

N

0 400 800 1,600
Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-56

NITROGEN (NITRATE-NITRITE) CONCENTRATIONS IN DEEP GROUNDWATER

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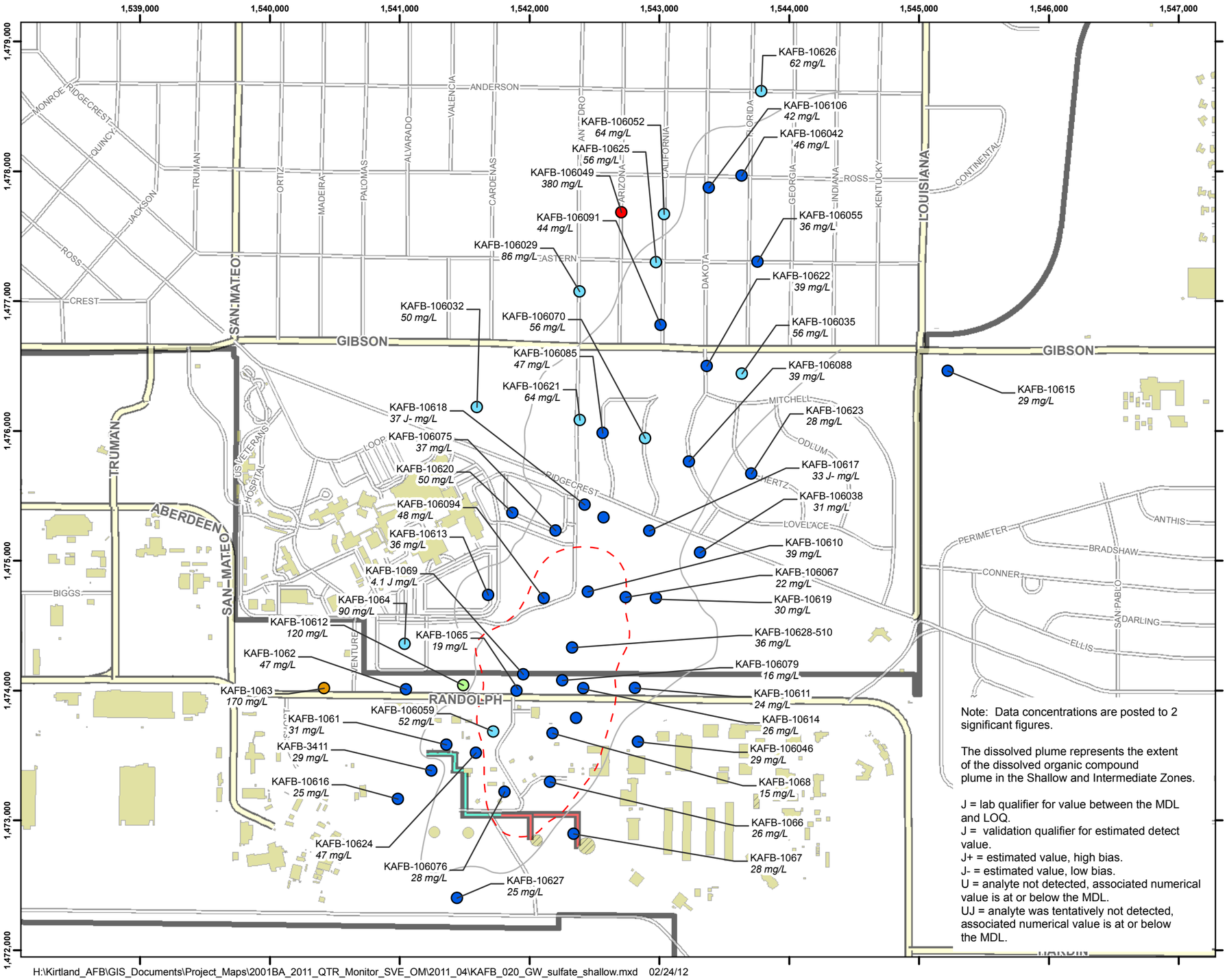
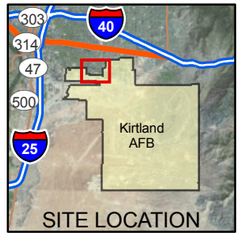


Legend

Sulfate Result (mg/L)

- 4.0 - 50
- 51 - 100
- 101 - 150
- 151 - 300
- 301 - 380
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
J+ = estimated value, high bias.
J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

N

Revision Date: 02/24/12

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-57

SULFATE CONCENTRATIONS
IN SHALLOW GROUNDWATER

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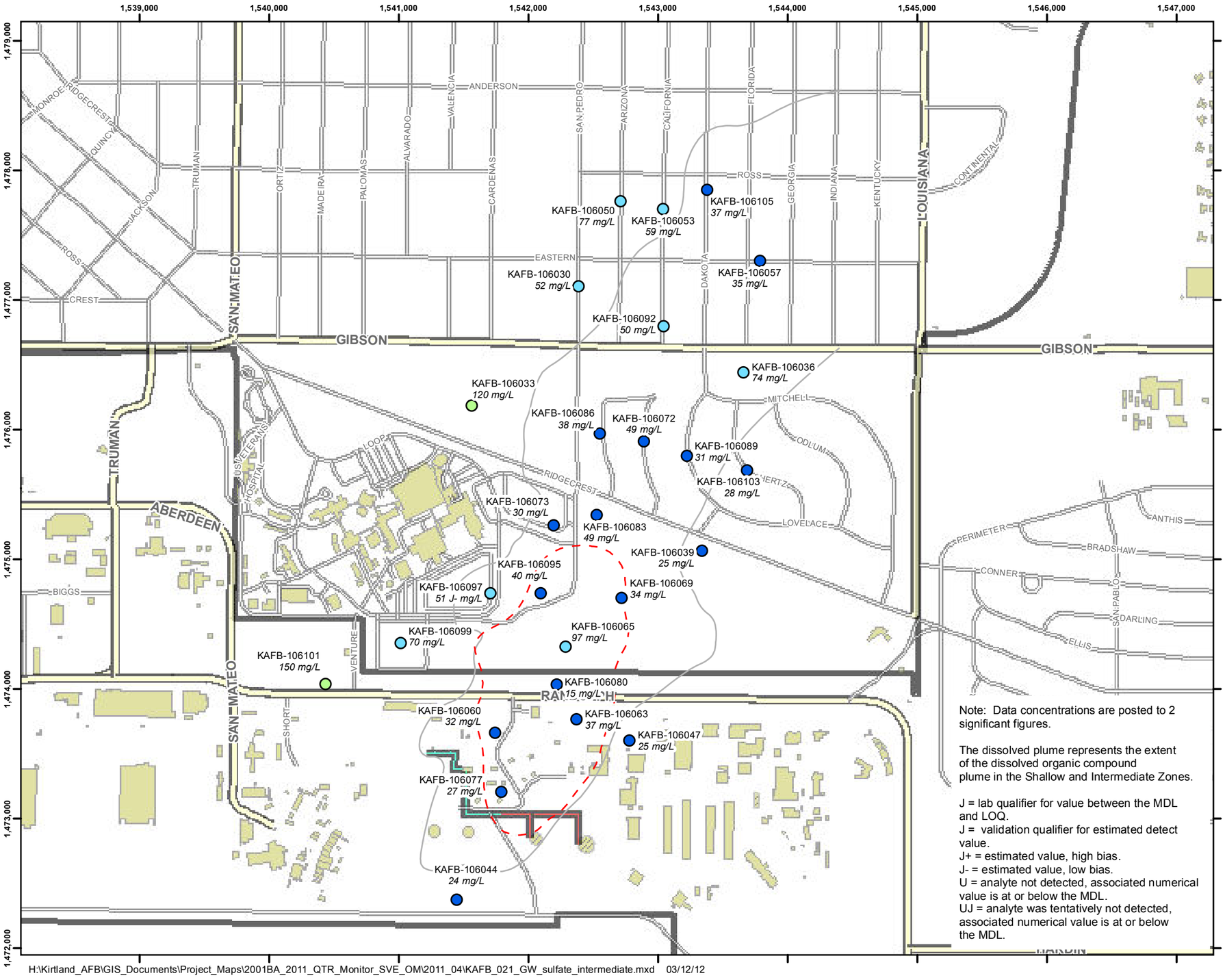
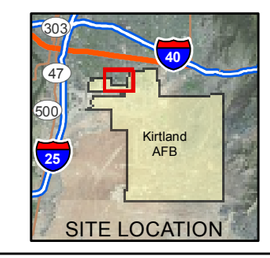


Legend

Sulfate Result (mg/L)

- 4.0 - 50
- 51 - 100
- 101 - 150
- 151 - 300
- 301 - 380
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

J = lab qualifier for value between the MDL and LOQ.
J = validation qualifier for estimated detect value.
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J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-58

SULFATE CONCENTRATIONS
IN INTERMEDIATE GROUNDWATER

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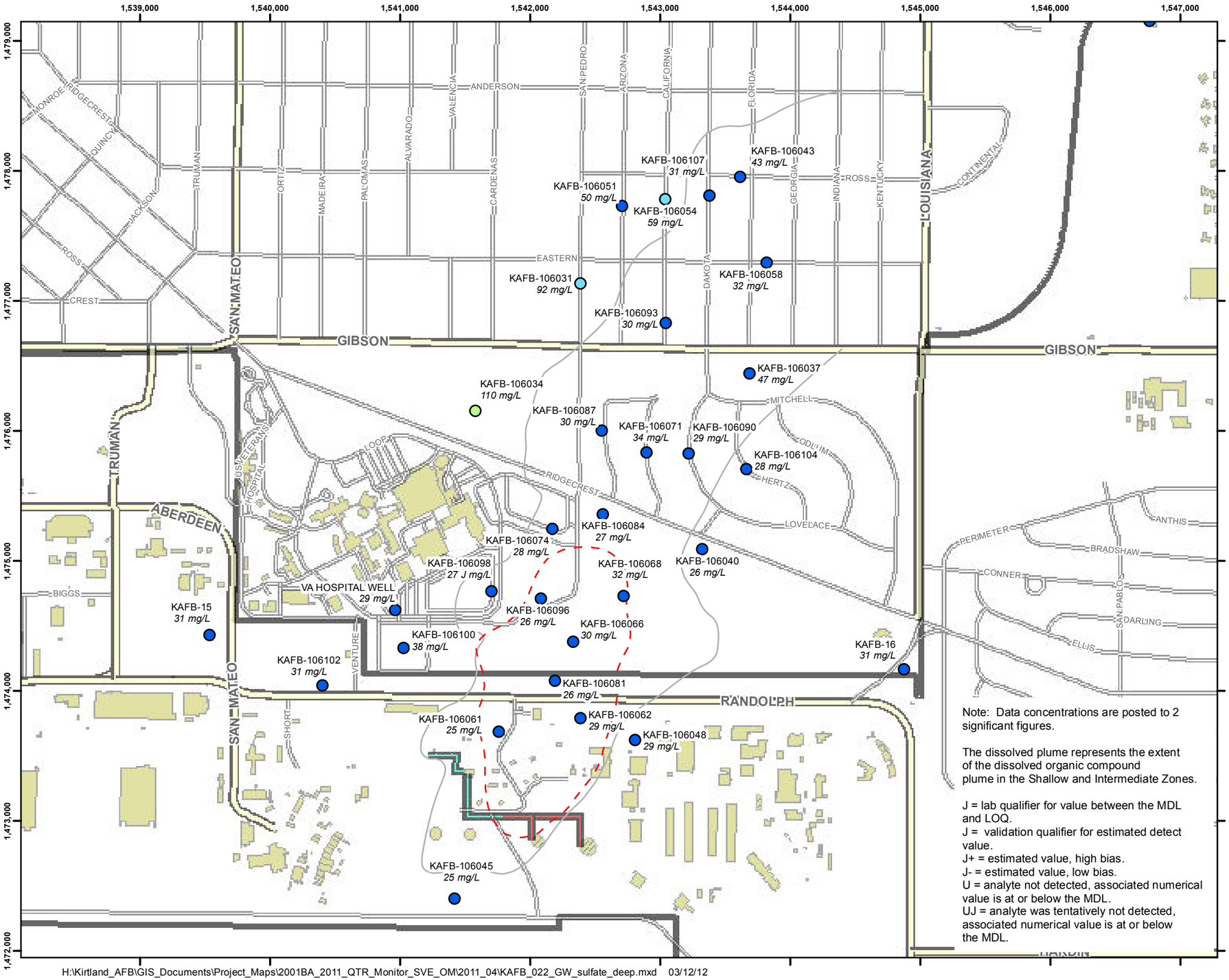
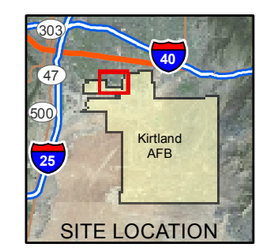


Legend

Sulfate Result (mg/L)

- 4.0 - 50
- 51 - 100
- 101 - 150
- 151 - 300
- 301 - 380
- Dissolved Plume December 2011
- Historical Area of Observed NAPL (July 2009)
- Major Road
- Road
- Aboveground Fuel Transfer Lines
- Underground Fuel Transfer Lines
- Previously Existing Structure
- Existing Structure
- Installation Boundary



Note: Data concentrations are posted to 2 significant figures.

The dissolved plume represents the extent of the dissolved organic compound plume in the Shallow and Intermediate Zones.

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J = validation qualifier for estimated detect value.
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J- = estimated value, low bias.
U = analyte not detected, associated numerical value is at or below the MDL.
UJ = analyte was tentatively not detected, associated numerical value is at or below the MDL.

Revision Date: 03/12/12

N

0 400 800 1,600

Feet
1 inch = 800 feet

Projection : NAD83 State Plane New Mexico Central FIPS3002 Feet

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FIGURE 5-59

SULFATE CONCENTRATIONS IN DEEP GROUNDWATER

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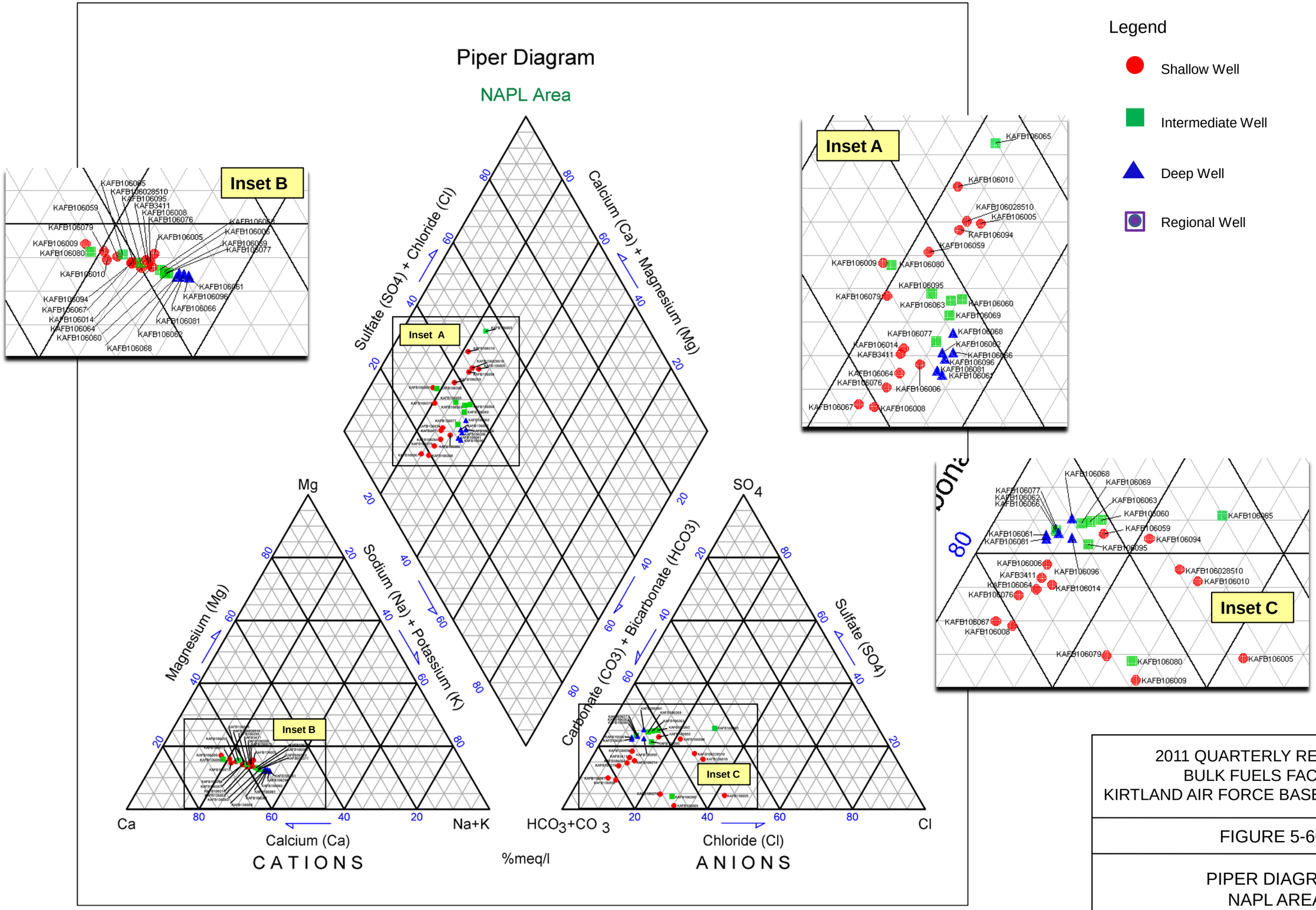

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BULK FUELS FACILITY
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FIGURE 5-60

PIPER DIAGRAM
NAPL AREA

KAFB_071_Piper_Stiff.ppt

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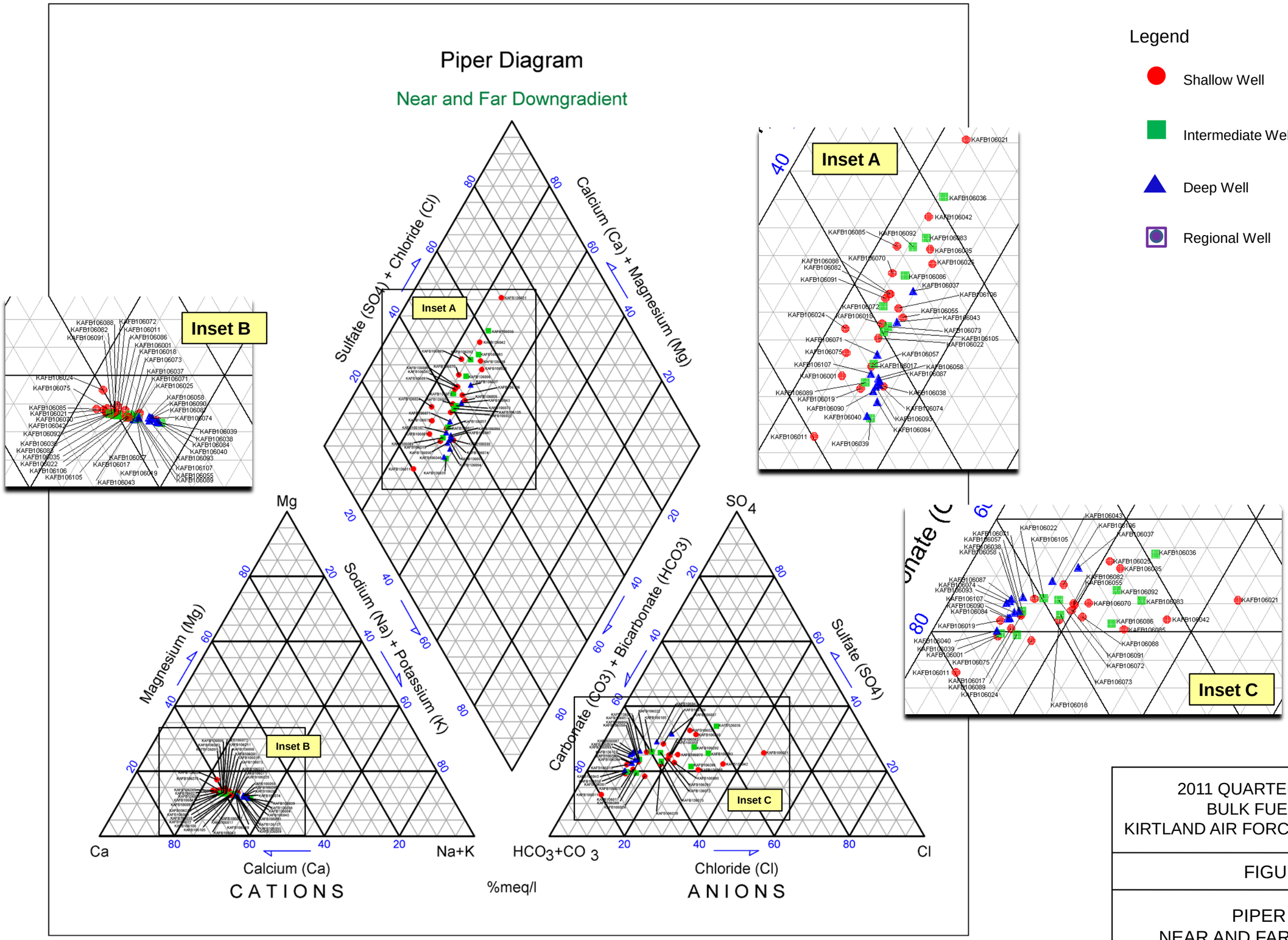

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-61

PIPER DIAGRAM
NEAR AND FAR DOWNGRADIENT

KAFB_071_Piper_Stiff.ppt

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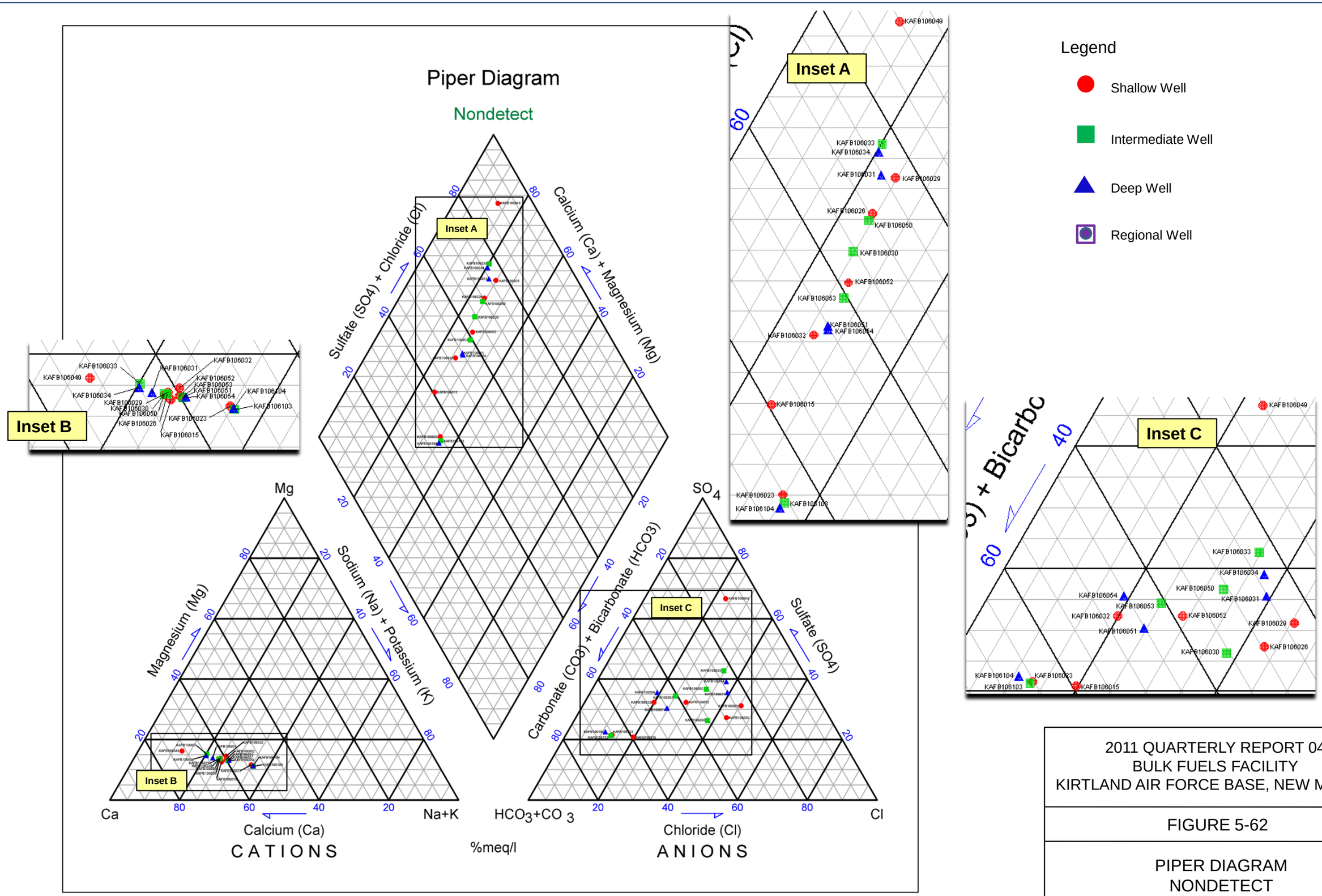

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-62

PIPER DIAGRAM
NONDETECT

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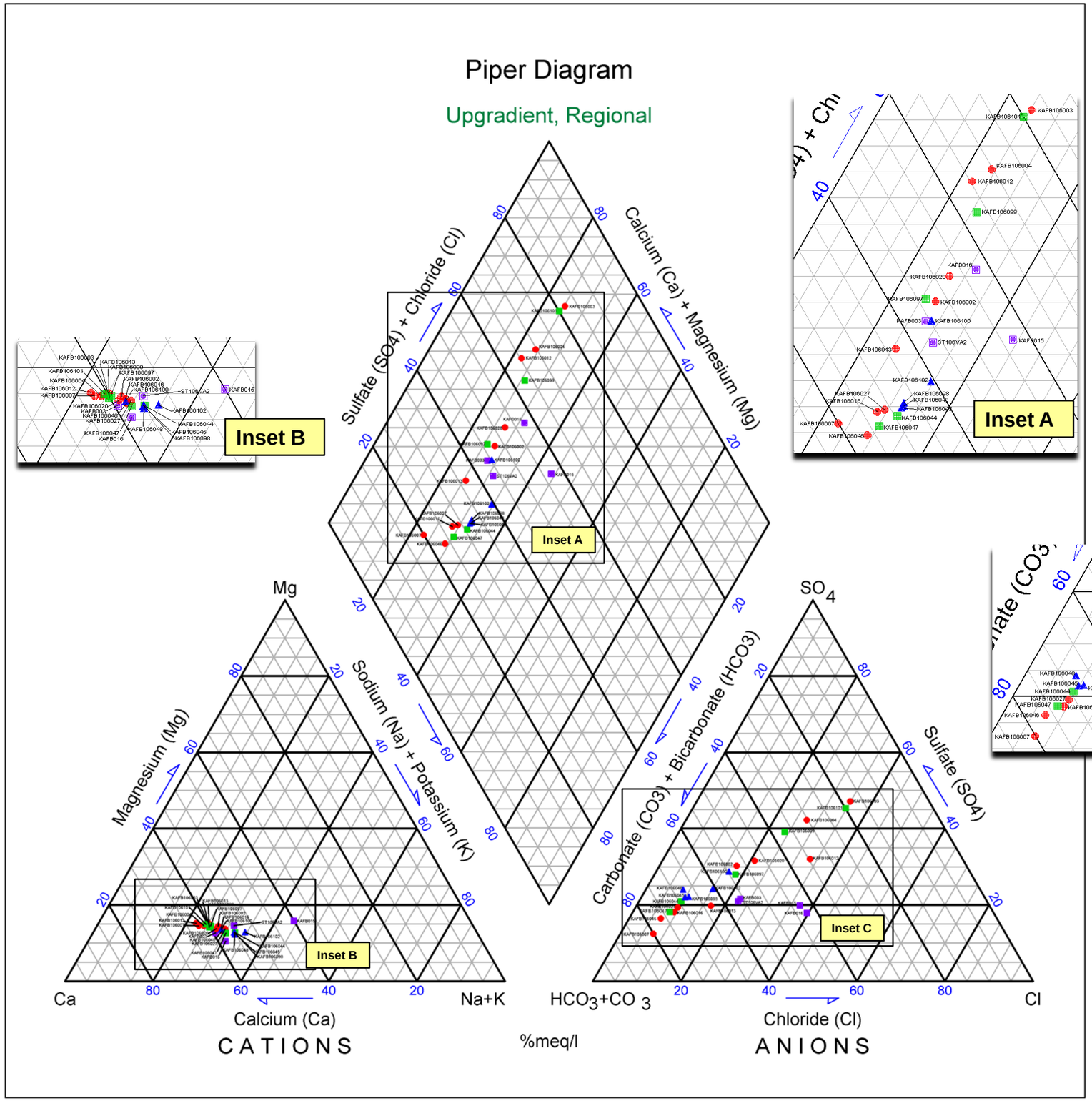

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-63

PIPER DIAGRAM
UPGRADIENT, REGIONAL

KAFB_071_Piper_Stiff.ppt

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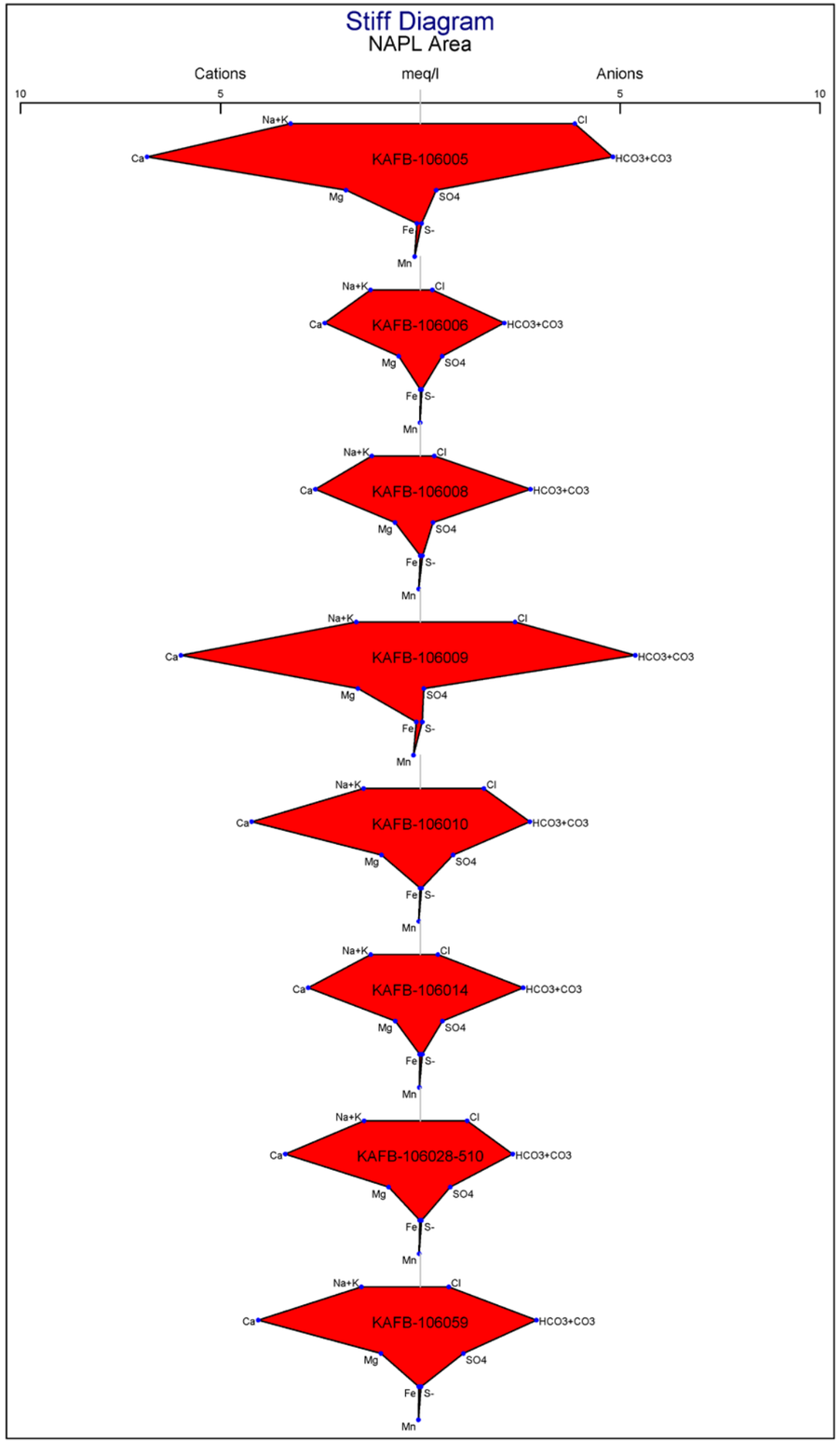

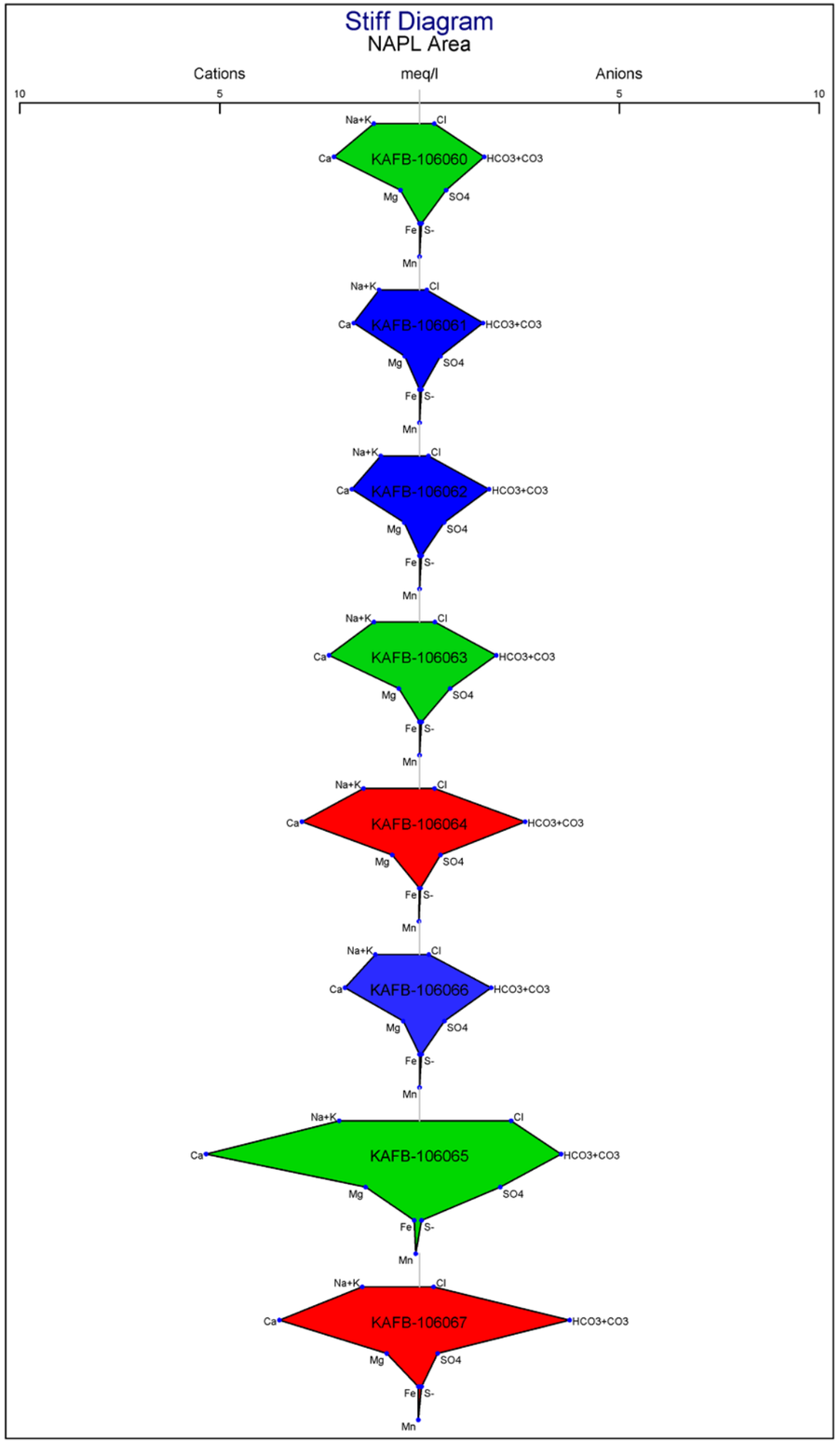

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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KIRTLAND AIR FORCE BASE, NEW MEXICO

FIGURE 5-64

STIFF DIAGRAMS
NAPL AREA
PART 1

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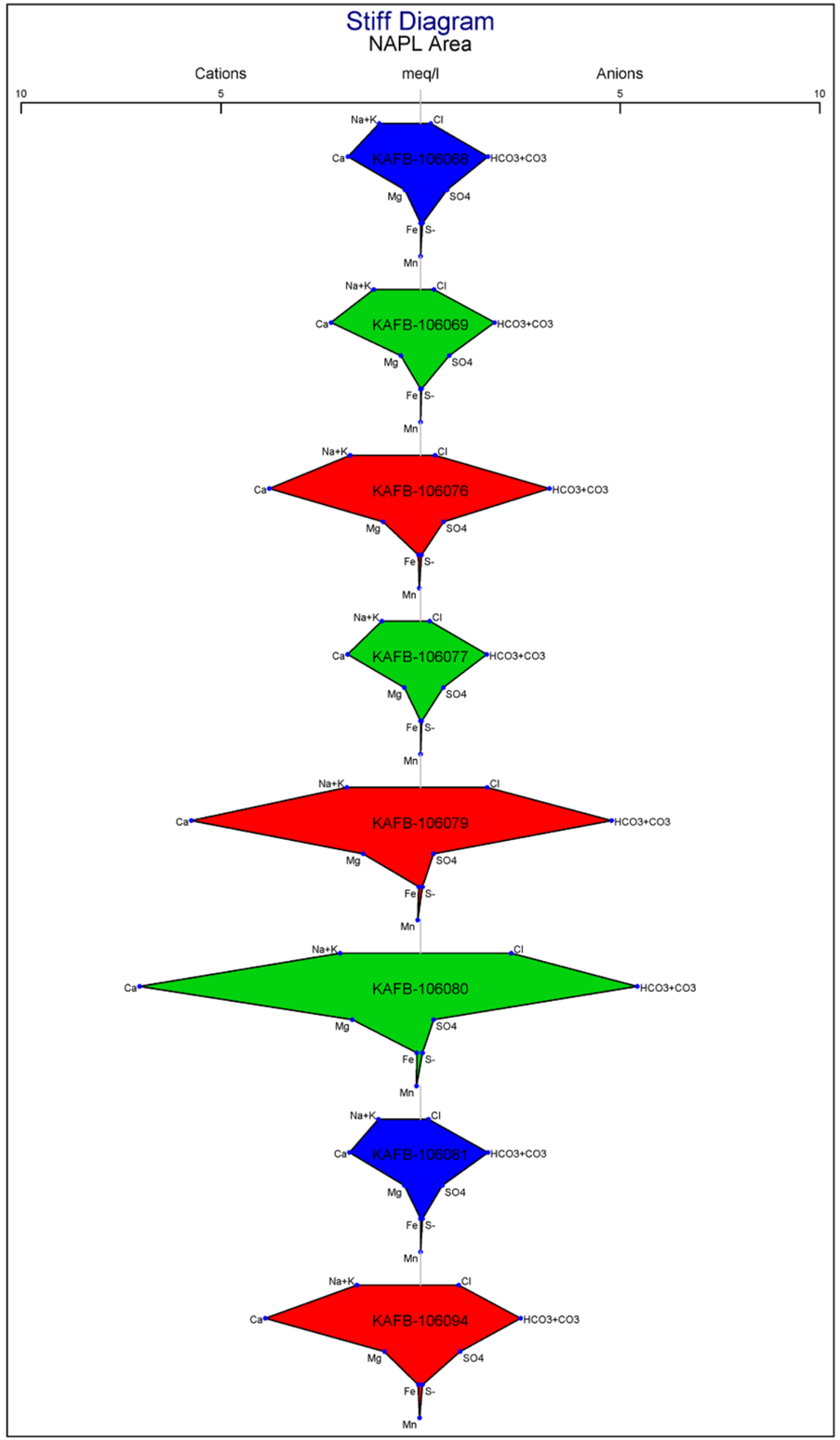

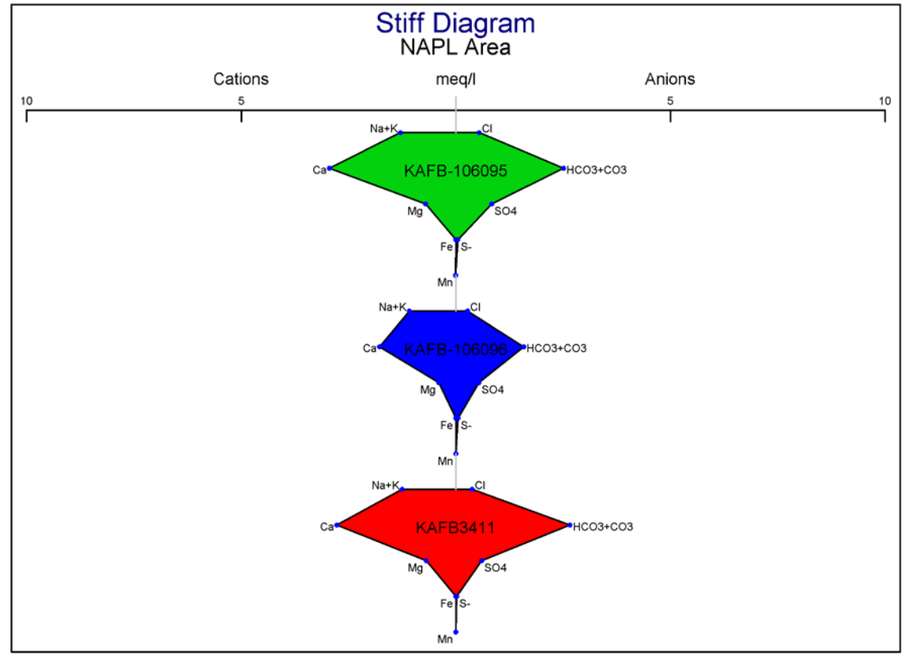

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-65

STIFF DIAGRAMS
NAPL AREA
PART 2

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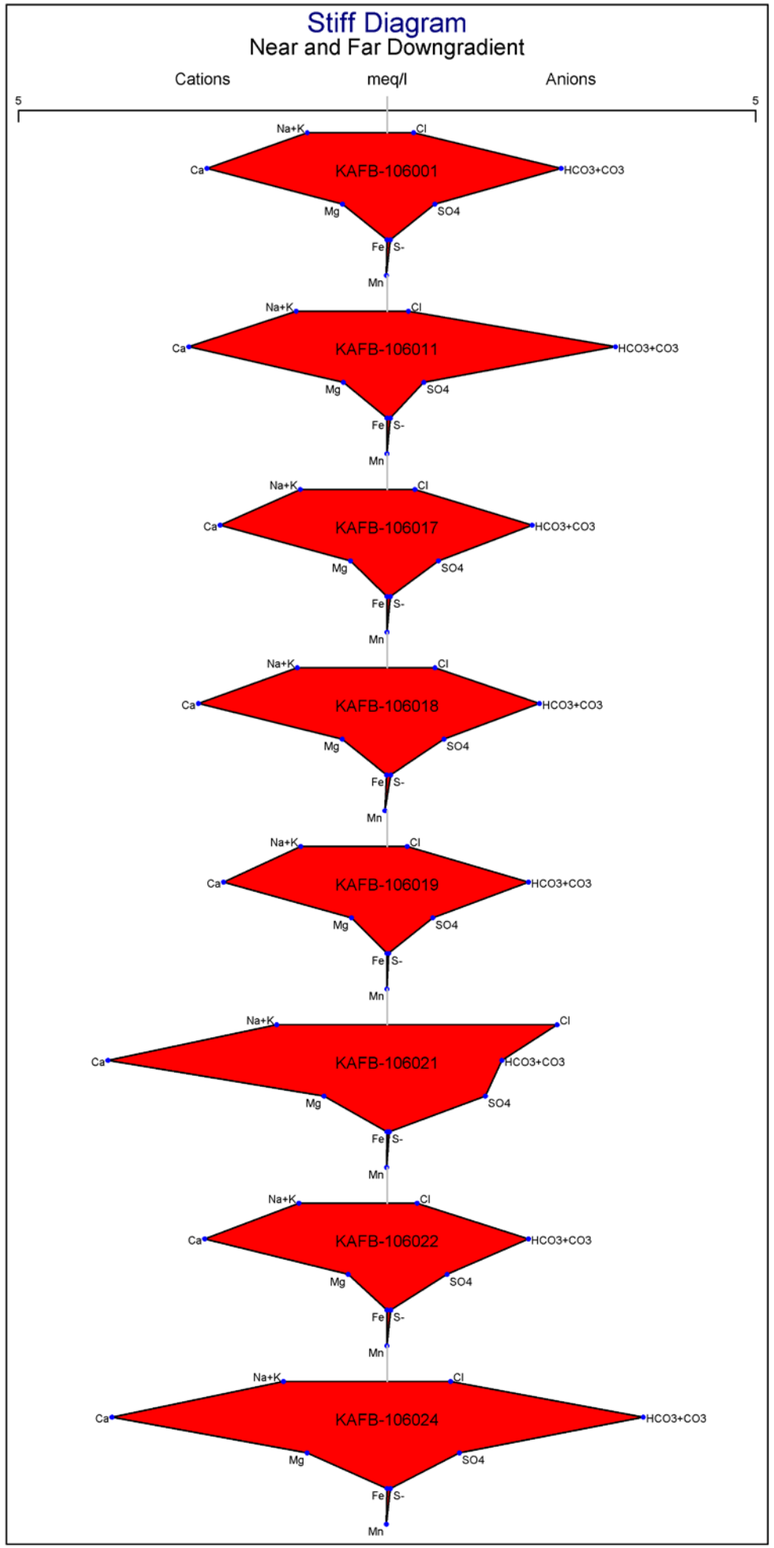

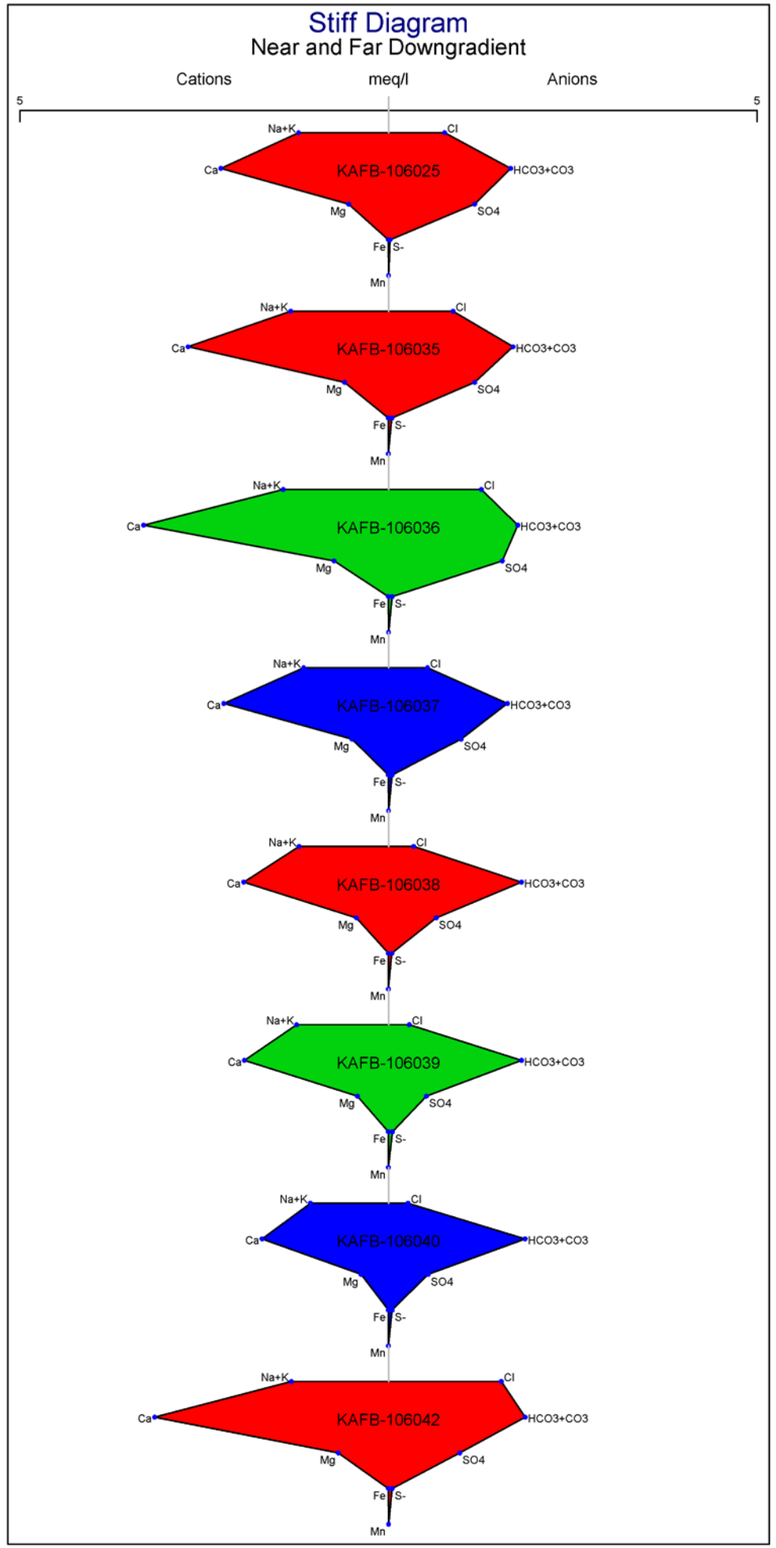

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-66

STIFF DIAGRAMS
NEAR AND FAR DOWNGRADIENT
PART 1

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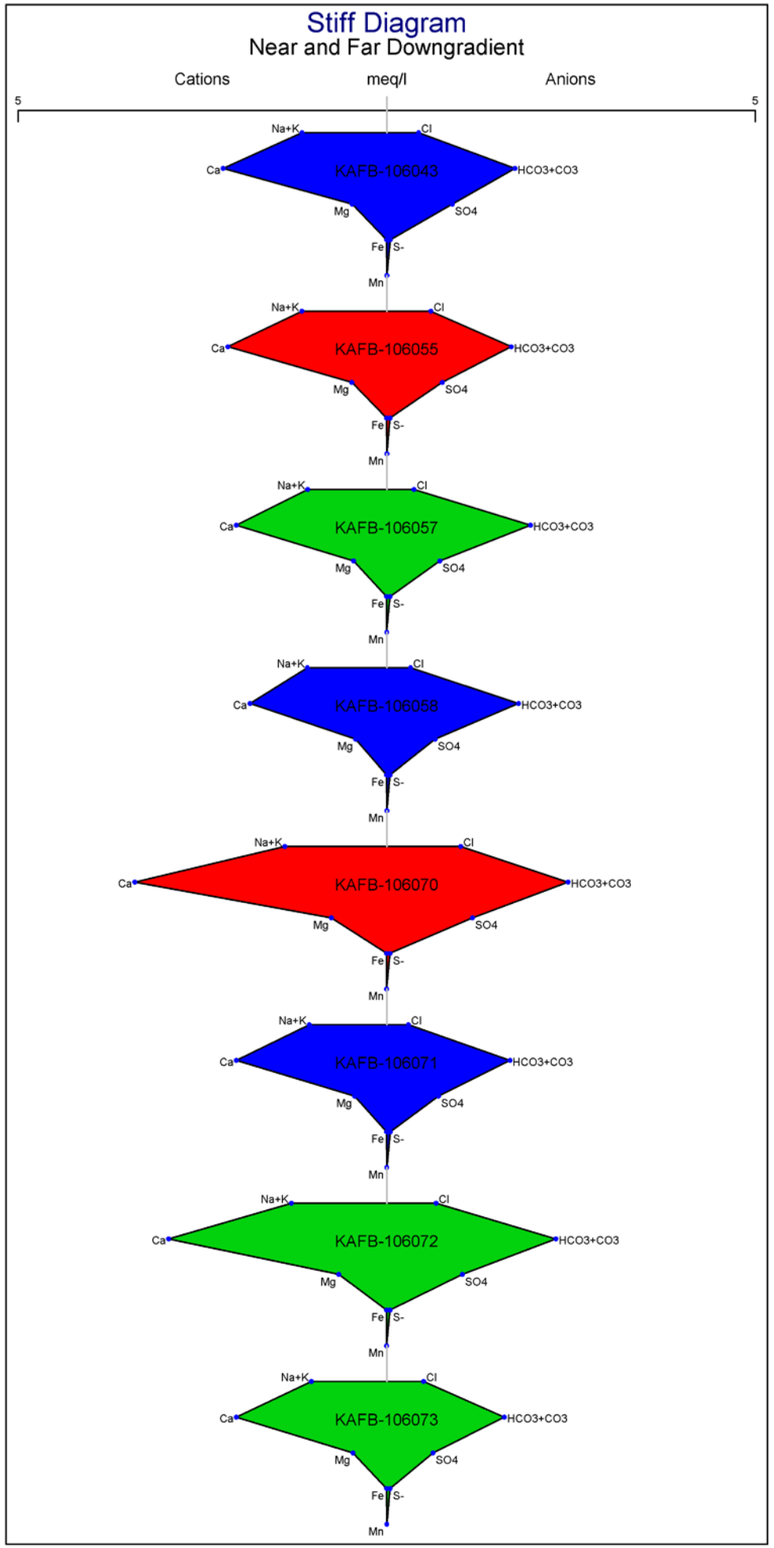

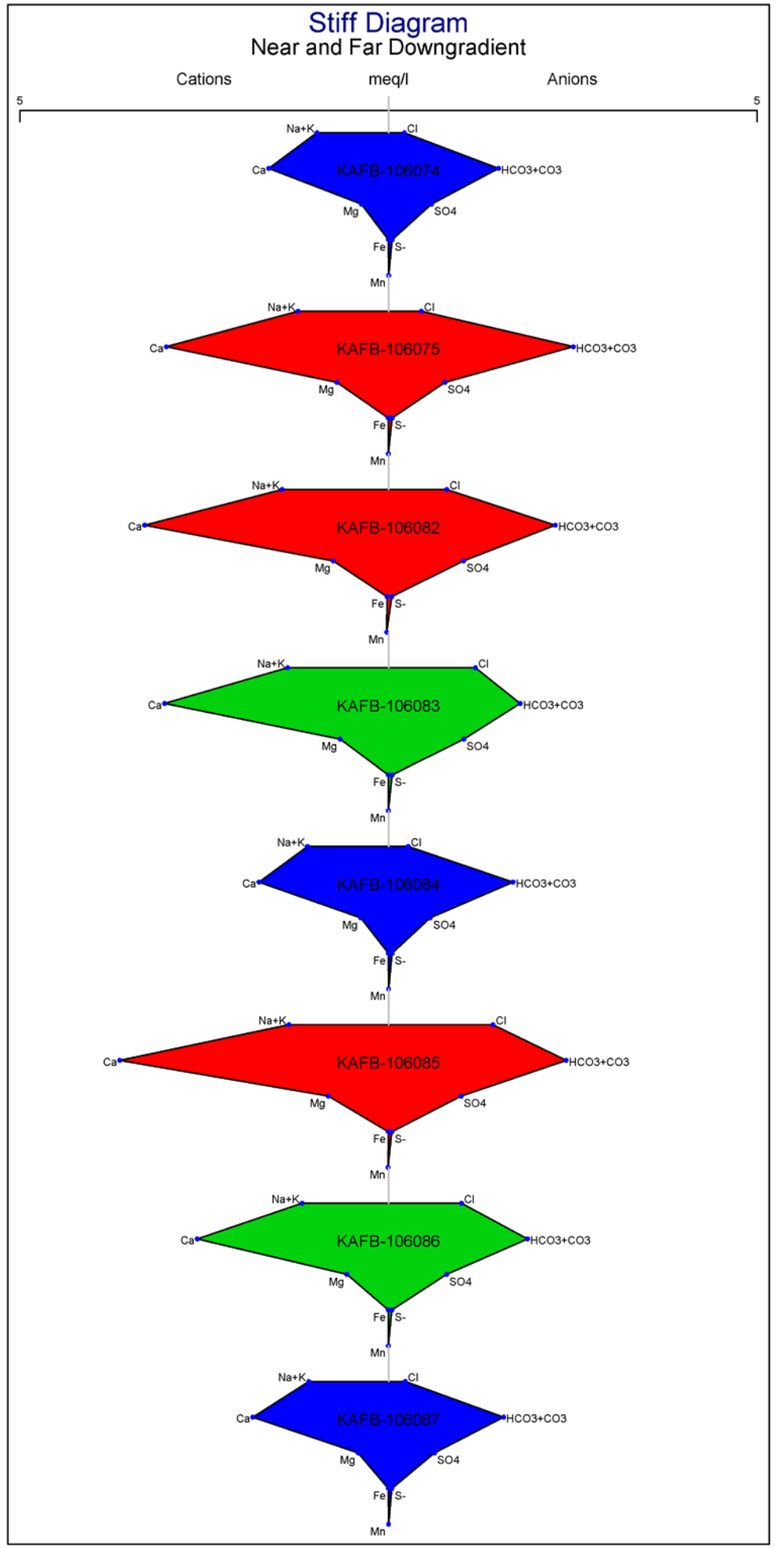

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-67

STIFF DIAGRAMS
NEAR AND FAR DOWNGRADIENT
PART 2

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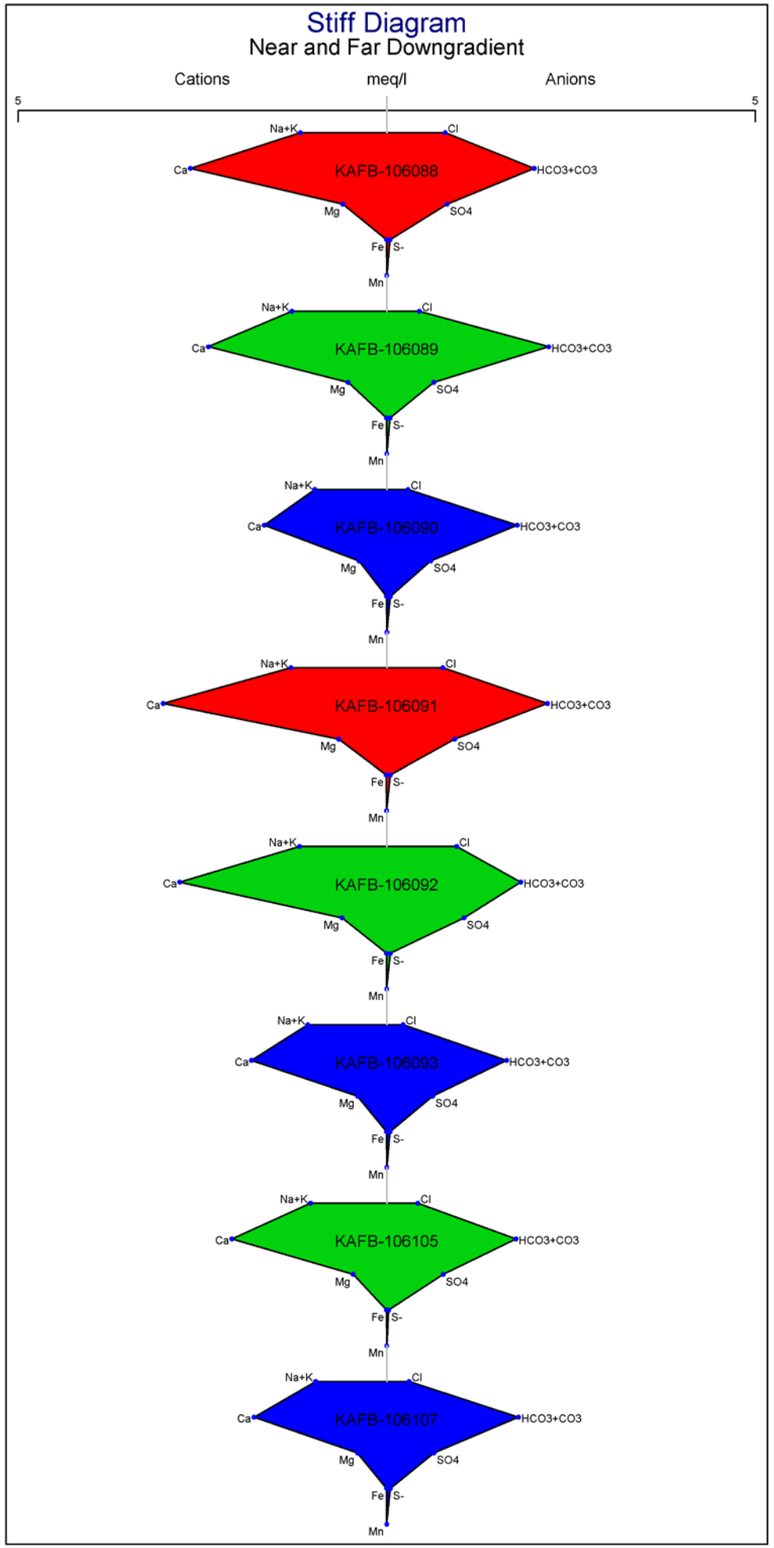

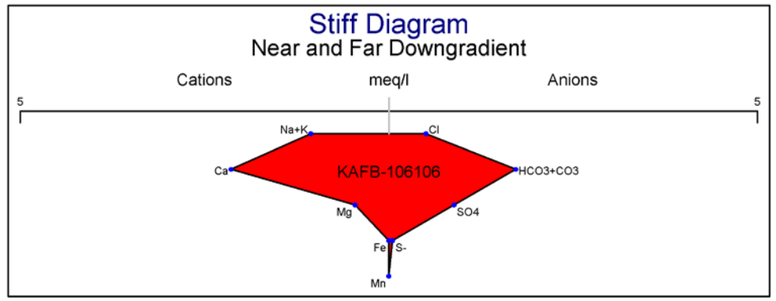

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-68

STIFF DIAGRAMS
NEAR AND FAR DOWNGRADIENT
PART 3

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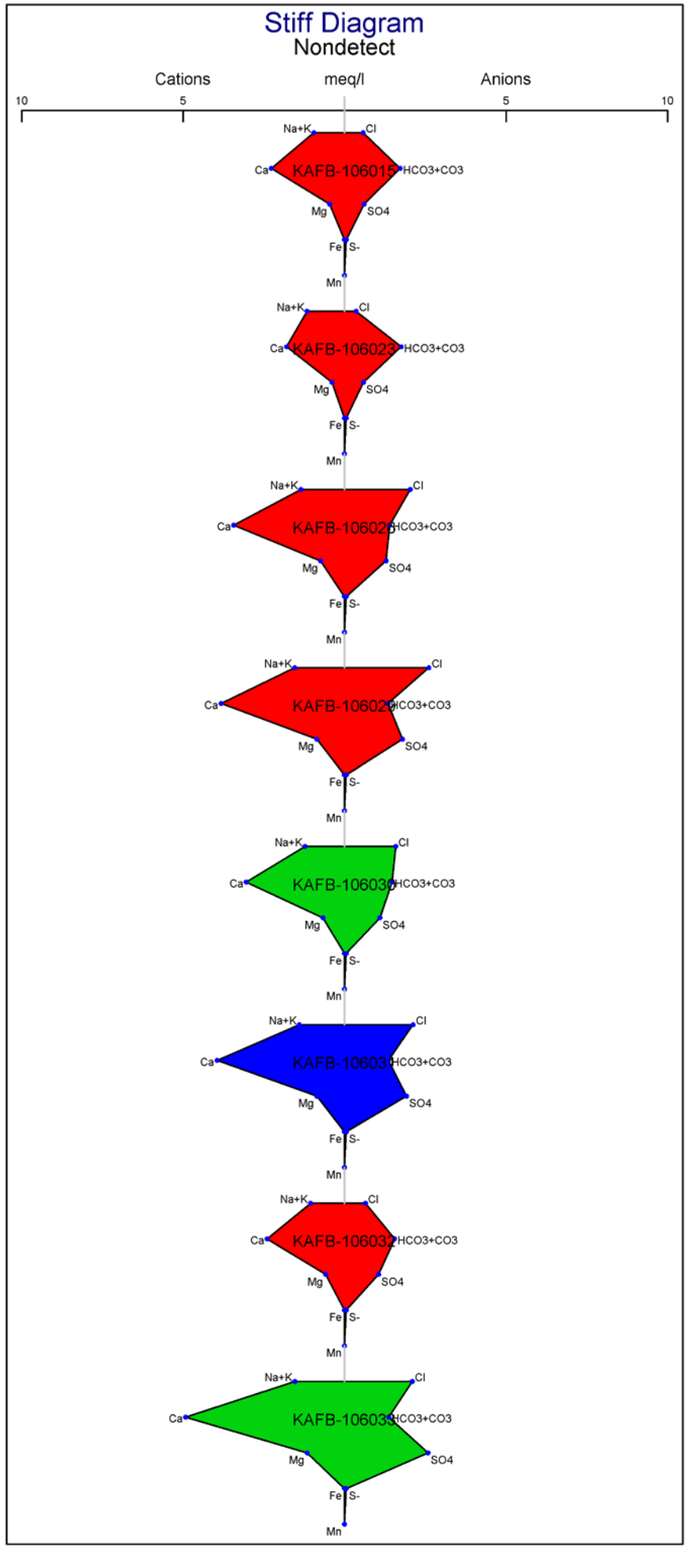

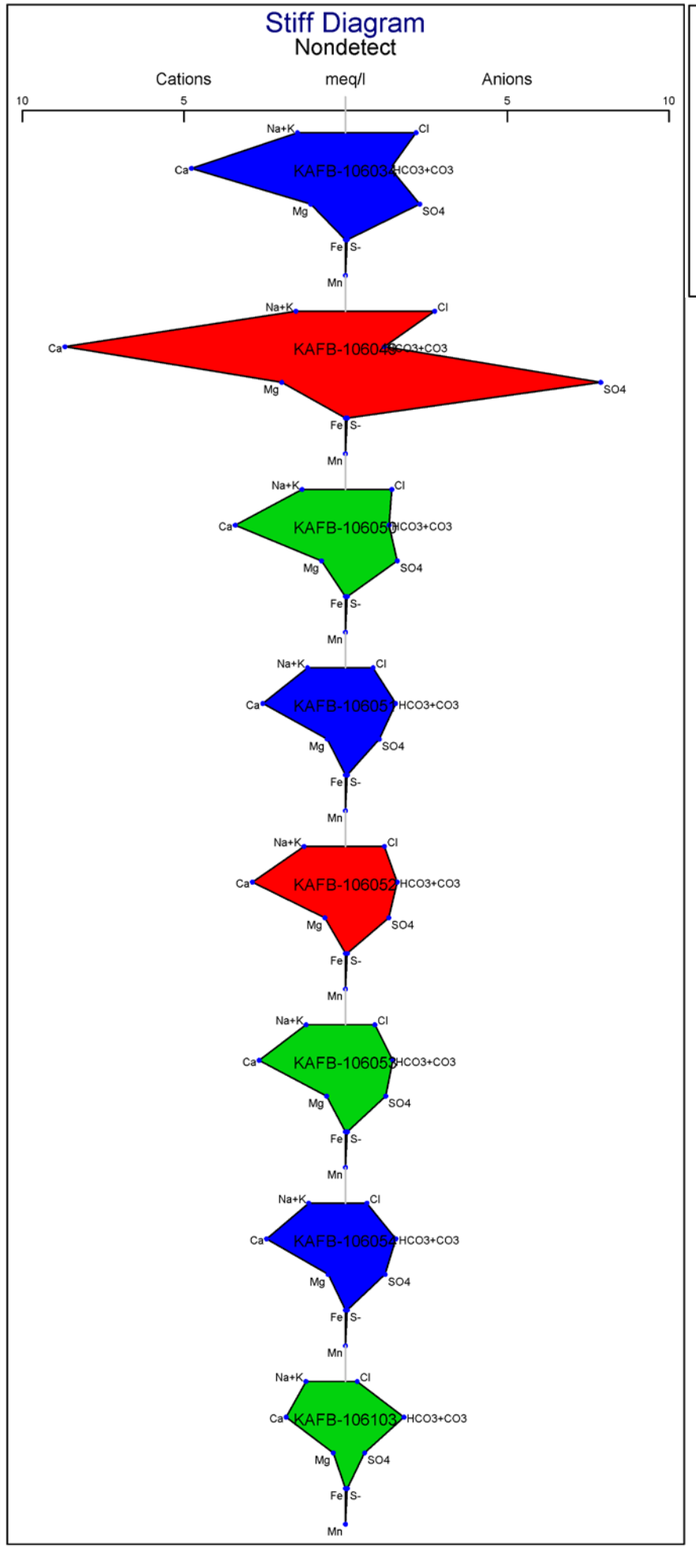

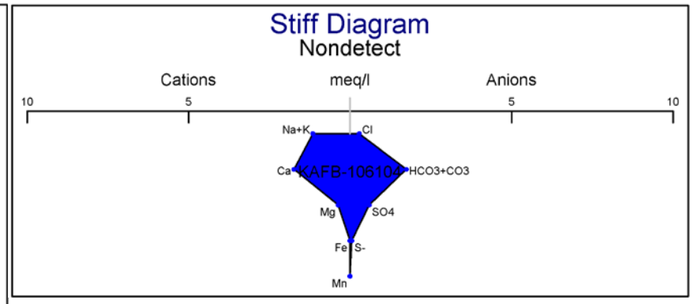

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-69

STIFF DIAGRAMS
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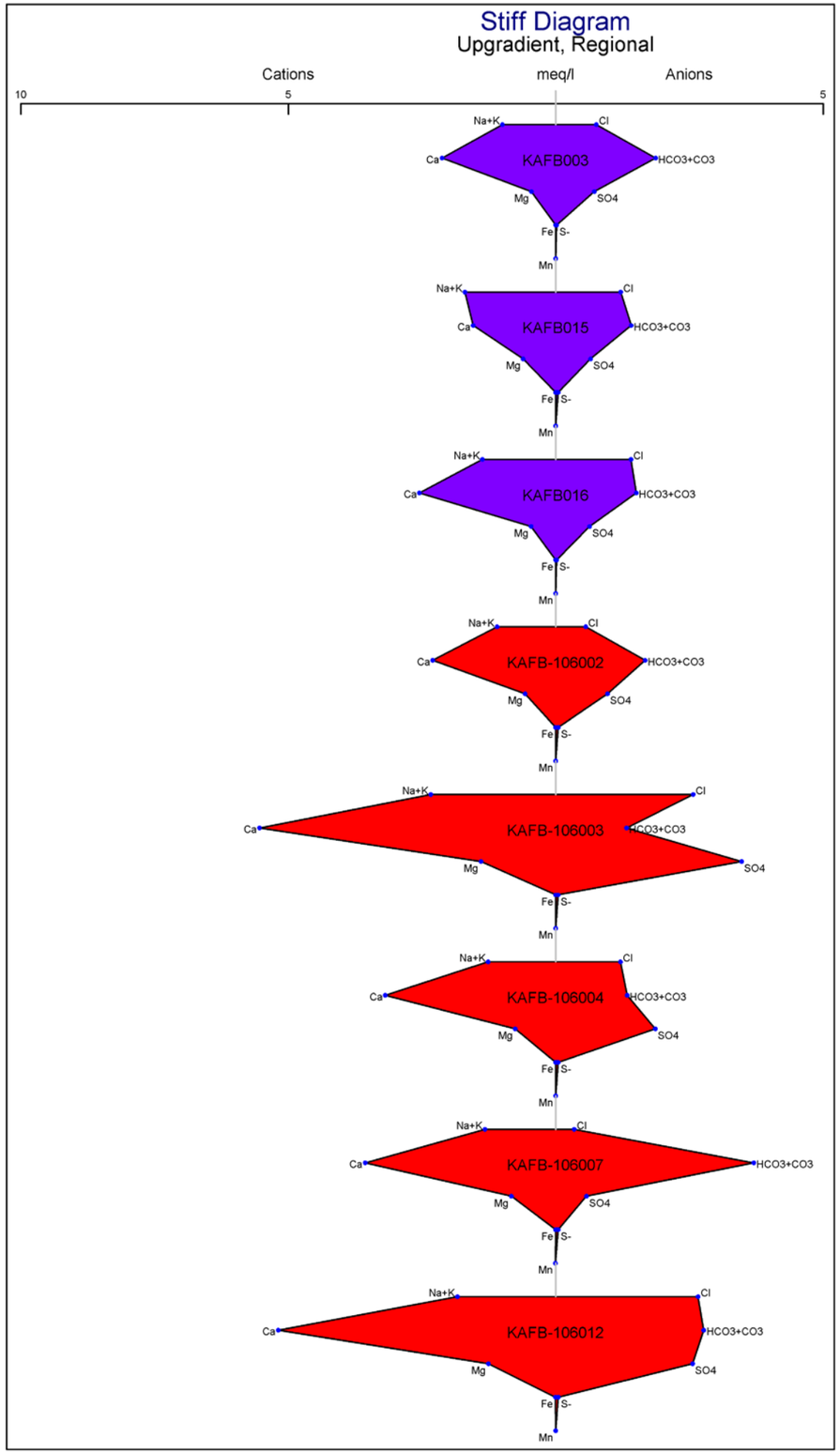

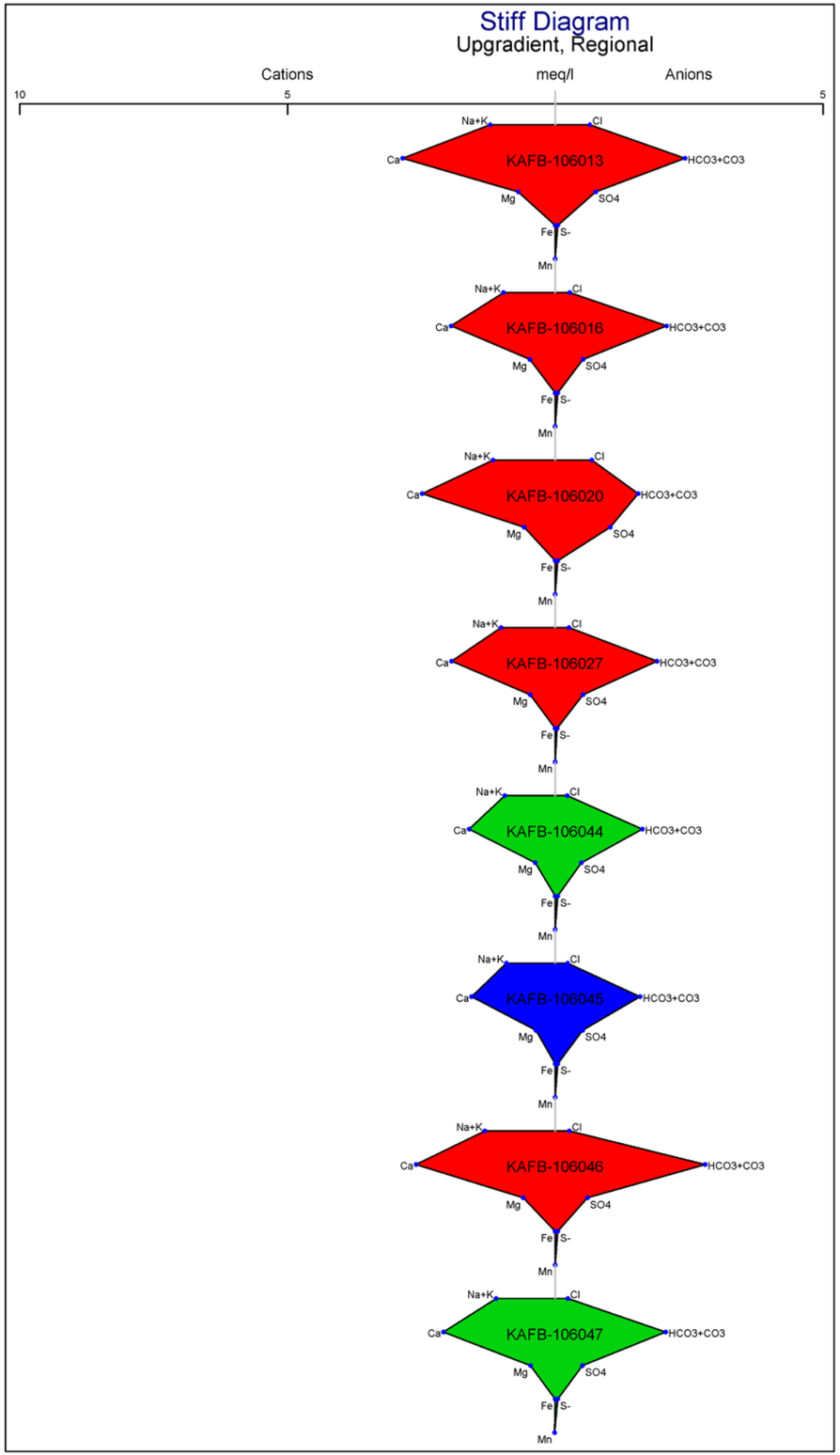

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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FIGURE 5-70

STIFF DIAGRAMS
UPGRADIENT, REGIONAL
PART 1

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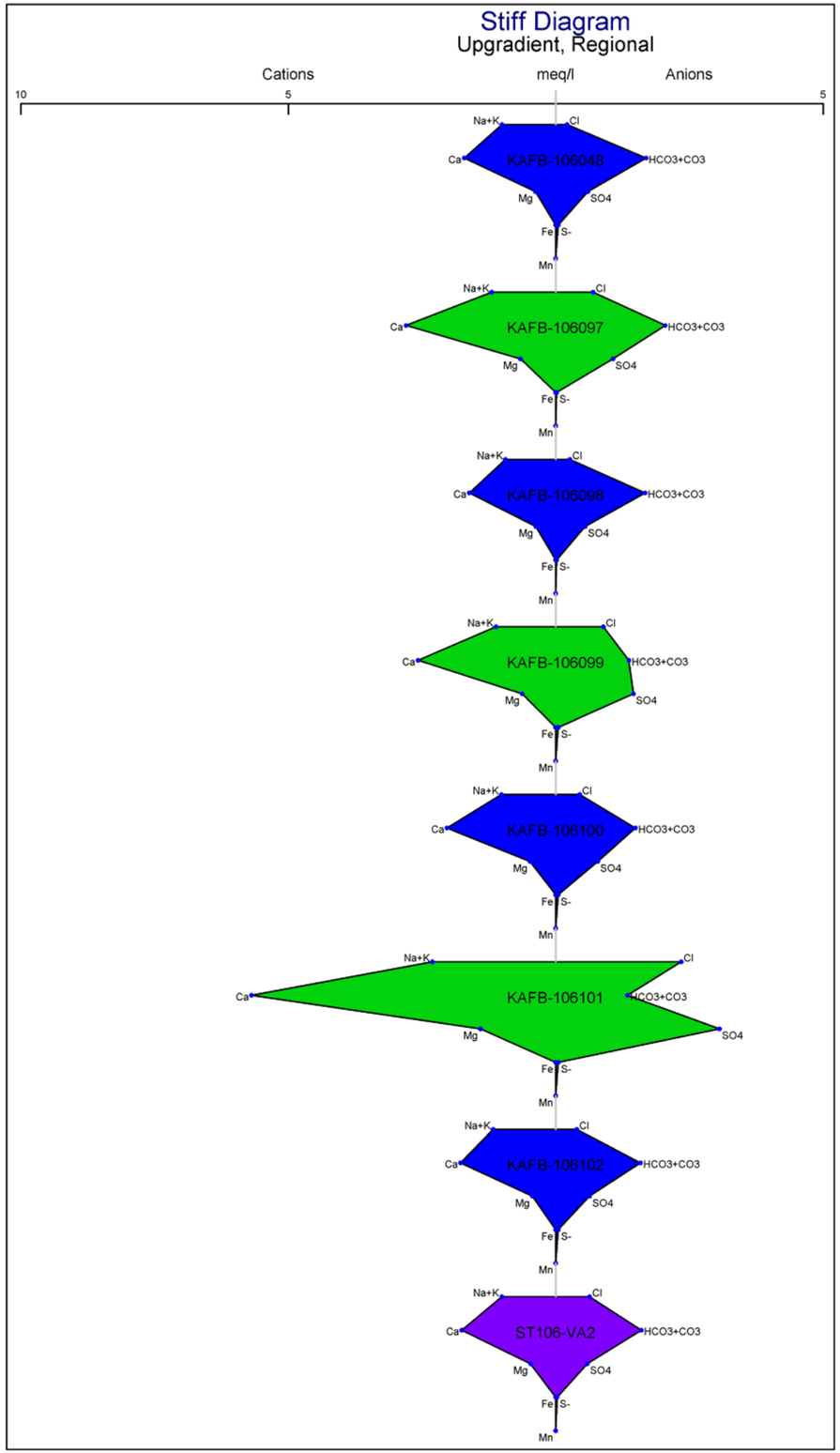

Legend

- Shallow Well
- Intermediate Well
- Deep Well
- Regional Well

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BULK FUELS FACILITY
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FIGURE 5-71

STIFF DIAGRAMS
UPGRADIENT, REGIONAL
PART 2

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SECTION 7 FIGURES
CROSS SECTIONS

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SECTION 7 FIGURES
LIST OF ALL CROSS SECTIONS
(including cross sections to be included in future quarterly reports)

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Cross Sections and Maps for Quarterly Reports
QTR 4 2011

I. Geologic Cross Sections with Contamination Contours

- Topography map of all cross-section lines with all wells (Figure 7-1)
- Geologic Cross Section A-A' with induction logs (Figure 7-2)
- Geologic Cross Section B-B' with induction logs (Figure 7-3)
- Geologic Cross Section C-C' with induction logs (Figure 7-4)
- Geologic Cross Section D-D' with induction logs (Figure 7-5)
- Geologic Cross Section E-E' with induction logs (Figure 7-6)

- Geologic Cross Section A-A' with EDB Concentrations in Groundwater (Figure 7-7)
- Geologic Cross Section B-B' with EDB Concentrations in Groundwater (Figure 7-8)
- Geologic Cross Section C-C' with EDB Concentrations in Groundwater (Figure 7-9)
- Geologic Cross Section D-D' with EDB Concentrations in Groundwater (Figure 7-10)
- Geologic Cross Section E-E' with EDB Concentrations in Groundwater (Figure 7-11)

- Geologic Cross Section A-A' with Benzene Concentrations in Soil (QTR3, Appendix J, Plate J-1)
- Geologic Cross Section D-D' with Benzene Concentrations in Soil (QTR3, Appendix J, Plate J-2)
- Geologic Cross Section E-E' with Benzene Concentrations in Soil (QTR3, Appendix J, Plate J-3)

- Geologic Cross Section A-A' with Ethylbenzene Concentrations in Soil (QTR3, Appendix J, Plate J-4)
- Geologic Cross Section D-D' with Ethylbenzene Concentrations in Soil (QTR3, Appendix J, Plate J-5)
- Geologic Cross Section E-E' with Ethylbenzene Concentrations in Soil (QTR3, Appendix J, Plate J-6)

- Geologic Cross Section A-A' with Naphthalene Concentrations in Soil (QTR3, Appendix J, Plate J-7)
- Geologic Cross Section D-D' with Naphthalene Concentrations in Soil (QTR3, Appendix J, Plate J-8)
- Geologic Cross Section E-E' with Naphthalene Concentrations in Soil (QTR3, Appendix J, Plate J-9)

- Geologic Cross Section A-A' with TPH Concentrations in Soil (QTR3, Appendix J, Plate J-10)
- Geologic Cross Section D-D' with TPH Concentrations in Soil (QTR3, Appendix J, Plate J-11)
- Geologic Cross Section E-E' with TPH Concentrations in Soil (QTR3, Appendix J, Plate J-12)

II. Vapor Contamination Cross Sections

- Benzene Concentrations
  - Lithology and Lab TPH Vapor Cross-Section F-F' (Figure 4-5)
  - Lithology and Lab TPH Vapor Cross-Section G-G' (Figure 4-6)
  - Lithology and Lab TPH Vapor Cross-Section H-H' (Figure 4-7)
  - Lithology and Lab TPH Vapor Cross-Section I-I' (Figure 4-8)
  - Lithology and Lab TPH Vapor Cross-Section J-J' (Figure 4-9)
  - Lithology and Lab TPH Vapor Cross-Section K-K' (Figure 4-10)

- Total Volatile Organics Concentrations
  - Lithology and Benzene Vapor Cross-Section F-F' (Figure 4-11)
  - Lithology and Benzene Vapor Cross-Section G-G' (Figure 4-12)
  - Lithology and Benzene Vapor Cross-Section H-H' (Figure 4-13)
  - Lithology and Benzene Vapor Cross-Section I-I' (Figure 4-14)
  - Lithology and Benzene Vapor Cross-Section J-J' (Figure 4-15)
  - Lithology and Benzene Vapor Cross-Section K-K' (Figure 4-16)

III. Soil Contamination Maps

- All Soil Maps were presented in the QTR3 2011 Report and are now presented in Appendix J-2

IV. Groundwater Contamination Maps

- Gasoline + Diesel Range Organics TPH Concentrations
  - Shallow - Gasoline Range Organics Concentrations in Groundwater (Figure 5-15)
  - Intermediate - Gasoline Range Organics Concentrations in Groundwater (Figure 5-16)
  - Deep - Gasoline Range Organics Concentrations in Groundwater (Figure 5-17)
  - Shallow - Diesel Range Organics Concentrations in Groundwater (Figure 5-18)
  - Intermediate - Diesel Range Organics Concentrations in Groundwater (Figure 5-19)
  - Deep - Diesel Range Organics Concentrations in Groundwater (Figure 5-20)

- EDB concentrations
  - Shallow – EDB Concentrations in Groundwater (Figure 5-21)
  - Intermediate - EDB Concentrations in Groundwater (Figure 5-22)
  - Deep - EDB Concentrations in Groundwater (Figure 5-23)

- Benzene concentrations
  - Shallow –Benzene Concentrations in Groundwater (Figure 5-24)
  - Intermediate - Benzene Concentrations in Groundwater (Figure 5-25)
  - Deep - Benzene Concentrations in Groundwater (Figure 5-26)

- Toluene concentrations
  - Shallow – Toluene Concentrations in Groundwater (Figure 5-27)
  - Intermediate - Toluene Concentrations in Groundwater (Figure 5-28)
  - Deep - Toluene Concentrations in Groundwater (Figure 5-29)

- Total Xylene concentrations
  - Shallow – Total Xylene Concentrations in Groundwater (Figure 5-30)
  - Intermediate - Total Xylene Concentrations in Groundwater (Figure 5-31)
  - Deep - Total Xylene Concentrations in Groundwater (Figure 5-32)

- 1,2,4-Trimethylbenzene concentrations
  - Shallow – 1,2,4-Trimethylbenzene Concentrations in Groundwater (Figure 5-33)
  - Intermediate - 1,2,4-Trimethylbenzene Concentrations in Groundwater (Figure 5-34)
  - Deep - 1,2,4-Trimethylbenzene Concentrations in Groundwater (Figure 5-35)

- Naphthalene concentrations
  - Shallow – Naphthalene Concentrations in Groundwater (Figure 5-36)
  - Intermediate - Naphthalene Concentrations in Groundwater (Figure 5-37)
  - Deep - Naphthalene Concentrations in Groundwater (Figure 5-38)

- Dissolved Oxygen concentrations
  - Shallow – Dissolved Oxygen Concentrations in Groundwater (Figure 5-39)
  - Intermediate - Dissolved Oxygen Concentrations in Groundwater (Figure 5-40)
  - Deep - Dissolved Oxygen Concentrations in Groundwater (Figure 5-41)

- Oxidation Reduction Potential
  - Shallow – Oxidation Reduction Potential Concentrations in Groundwater (Figure 5-42)
  - Intermediate - Oxidation Reduction Potential Concentrations in Groundwater (Figure 5-43)
  - Deep - Oxidation Reduction Potential Concentrations in Groundwater (Figure 5-44)

- Alkalinity
  - Shallow – Alkalinity Concentrations in Groundwater (Figure 5-45)
  - Intermediate - Alkalinity Concentrations in Groundwater (Figure 5-46)
  - Deep - Alkalinity Concentrations in Groundwater (Figure 5-47)

- Iron concentrations
  - Shallow – Iron Concentrations in Groundwater (Figure 5-48)
  - Intermediate - Iron Concentrations in Groundwater (Figure 5-49)
  - Deep - Iron Concentrations in Groundwater (Figure 5-50)

- Manganese concentrations
  - Shallow – Manganese Concentrations in Groundwater (Figure 5-51)
  - Intermediate - Manganese Concentrations in Groundwater (Figure 5-52)
  - Deep - Manganese Concentrations in Groundwater (Figure 5-53)

- Nitrate/Nitrite concentrations
  - Shallow – Nitrate/Nitrite Concentrations in Groundwater (Figure 5-54)
  - Intermediate - Nitrate/Nitrite Concentrations in Groundwater (Figure 5-55)
  - Deep - Nitrate/Nitrite Concentrations in Groundwater (Figure 5-56)

- Sulfate concentrations
  - Shallow – Sulfate Concentrations in Groundwater (Figure 5-57)
  - Intermediate - Sulfate Concentrations in Groundwater (Figure 5-58)
  - Deep - Sulfate Concentrations in Groundwater (Figure 5-59)

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