WASHOE COUNTY
REQUEST FOR QUALIFICATIONS No. 3043-17

CONSULTING SERVICES TO SUPPORT THE CENTRAL TRUCKEE MEADOWS REMEDIATION DISTRICT PROGRAM IN ASSESSMENT OF POTENTIAL PCE SOURCE AREAS

The Washoe County Community Services Department (WCCSD) is requesting a Statement of Qualifications (SOQ) from firms qualified to provide consulting services in support of the Central Truckee Meadows Remediation District (CTMRD) Program in southern Washoe County, Nevada. Submitting firms must have available staff with the qualifications, experience, and resources to: perform the data gathering; collaborate in the data evaluation; and, prepare the reports described in this Request for Qualifications (RFQ). SOQs will be accepted until 2:00 PM (PST) on January 12, 2018. SOQs will not be accepted for consideration after that deadline.

The SOQ package shall be **clearly** marked on the outside, **"QUALIFICATIONS FOR CONSULTING SERVICES TO SUPPORT ASSESSMENT OF POTENTIAL PCE SOURCE AREAS IN THE CENTRAL TRUCKEE MEADOWS."** Four (4) copies of the SOQ shall be delivered to:

Washoe County Community Services Department
CTMRD Program
c/o: Chris Benedict
1001 E. Ninth Street, Building A
Reno, Nevada 89512

If the SOQ package is delivered in person, the Community Services Department is located at the west end, on the second floor of Building A of the Washoe County Complex. Complete SOQs received by the deadline will be evaluated in accordance with Sections 5 and 6 of this RFQ. WCCSD seeks to enter into a contractual agreement or agreements with the most qualified firm or firms. The contract(s) will be for activities which may include: data assessment; data acquisition; assessment of groundwater threat potential; mitigation of PCE sources and/or groundwater threats; participating in project meetings; and, preparing technical memoranda.

1. BACKGROUND

Activities conducted as part of the CTMRD Program have resulted in the delineation of several potential source areas (i.e. "PSAs") where Tetrachloroethene (PCE) contributing to groundwater contamination may be present (Figure 1). PCE has been detected in near-surface soil, soil vapor, and/or shallow groundwater in each of these PSAs. However, the nature, extent and magnitude, and potential threat to groundwater of PCE present in these PSAs have not been completely assessed.

The WCCSD is currently seeking to retain professional services to support focused assessment in three (3) PSAs to:

- Continue (as needed) delineation of localized areas of PCE contamination (i.e. PCE high mass areas ["HMAs"])
- Determine whether PCE concentration in HMAs exceeds the groundwater threat threshold

- Determine, based on total PCE mass in HMAs, whether significant threats to groundwater are present
- For those HMAs that constitute a significant threat to groundwater, make progress (as much as can be accomplished through the funding allocated for this phase of each of these PSA projects) toward:
    - Completing the characterization and remedial investigation
    - Identifying, selecting, and pilot testing remedial alternatives to determine the alternative that provides the most cost-beneficial PCE mass removal
    - Completing a feasibility study

Results from these activities will be actively shared with: representatives from city of Reno (the jurisdiction where these PSAs are located); the Nevada Division of Environmental Protection (NDEP); and/or, the Washoe County Health District (WCHD).

2. OBJECTIVES

The objectives of these activities are to:

- Continue the assessment of PCE HMAs that may be contributing to groundwater contamination;
- Identify those HMAs that constitute a significant threat to groundwater.
- Use analysis of pre-existing data, along with new data generated during these projects (and subsequent analysis) to complete or make substantial progress toward completing the Source characterization to determine whether or not a threat to groundwater is present.
    - If no threat to groundwater is identified, assessment activities at a given HMA will cease.
    - If a threat to groundwater is verified, activities will continue and may include some or all of the following activities:
        - Remedial investigation;
        - Pilot testing;
        - Feasibility study; and,
        - Preliminary cost estimate to remediate the HMAs that constitute a significant threat to groundwater.

These objectives will be met by working in close collaboration with WCCSD to:

- Review the existing data and the previously identified data gaps;
- Define and implement a data acquisition program;
- Update the HMA threat assessment;
- Update the data gap analysis for each HMA to identify additional data needed to meet the project objectives; and,
- Working within a progressive characterization - remedial investigation/feasibility study - cost-estimate framework and decision making process: make recommendations for and develop an approach for phased and prioritized data acquisition and analysis.

Results from these investigations may (in the event that the data obtained identify a specific parcel where PCE contamination that poses a threat to groundwater appears to be located) be submitted to NDEP by WCCSD for review and potential regulatory action.

3. POTENTIAL SOURCE AREAS FOR FURTHER INVESTIGATION

Descriptions of the three (3) subject PSAs are provided below. These descriptions are presented with the goal of illustrating site conditions so that submitting firm(s) can demonstrate relevant capabilities and the required experience. This information should be used by the submitting firm to select and highlight the qualifications, experience, and resources available to perform the work needed.

Potential Source Area 1 – The Mill/Kietzke PSA

The Mill/Kietzke PSA (Figure 2) is located in east Reno, proximal to the up gradient portion of the Mill/Kietzke groundwater PCE plume. This PSA is transected by major arteries (Mill Street and Kietzke Lane) and has had variable land use over time (including agricultural, commercial, light-industrial, and residential activity). Numerous potentially contributory activities (PCAs, both historical and current) have been identified in this PSA. One prior regulatory corrective action, associated with PCE impacts in soil, took place (at a former chemical supply company that received a regulatory no further action) to the north-northwest of this PSA. Four PCE high mass areas (HMAs) were initially delineated in this PSA based on passive soil gas (PSG) data.

Work to date in and around the Mill/Kietzke PSA has determined the following:

- The geologic materials occurring in the subsurface consist of unconsolidated, heterogeneous, very coarse to fine grained, fluvial and glacio-fluvial sediments.
- The central Truckee Meadows is underlain by a complex aquifer system. While the greater aquifer system can be generally characterized as heterogeneous and unconfined, it locally exhibits confined to leaky confined behavior. The unambiguous response of a deep zone monitoring well (CTM10D) and several shallow zone monitoring wells (CTM9S, CTM11S, CTM13S, CTM38D, CTM104, and CTM105) to pumping at the Mill municipal water supply well indicates that the aquifer in the Mill/Kietzke area behaves like a heterogeneous unconfined system.
- Shallow zone groundwater in the vicinity of the Mill/Kietzke PSA occurs at an approximate depth of 35 to 50 ft bgs. Water level is subject to fluctuation in response to municipal water supply well pumping and to longer term changes in precipitation and overall groundwater demand.
- Groundwater in the vicinity of the Mill/Kietzke PSA is also influenced by pumping at municipal water supply wells. The PCE-impacted Mill municipal water supply well (completed in the deep zone) exerts a hydraulic influence on groundwater in this PSA. This well (with a capacity of approximately 1800 gpm) is located approximately 1500 feet to the southeast of the Mill Street and Kietzke Lane road intersection.
- PCE concentration in groundwater from wells in the Mill/Kietzke PSA is both spatially and temporally variable. There are multiple monitoring wells where PCE concentration data suggest the presence of multiple groundwater “hot spots” where shallow zone PCE concentration is significantly elevated relative to the rest of the Mill/Kietzke plume.
  These include:

- ARCO6018MW11; where PCE has been as high as 1108 µg/L (in March 2000), with transient spikes of 850 µg/L (in August 2006), 140 µg/L (in March 2007), and 200 µg/L (in June 2010, June 2011, and March 2012).
- CTM127B; where PCE has been as high as 1200 µg/L (in December 2013), with transient spikes of 530 µg/L (in September 2012), 230 µg/L (in September 2014), 250 µg/L (in October 2016), and 190 µg/L (in March 2017).
- CTM133B; where PCE has been as high as 1080 µg/L (in March 2016), with transient spikes of 240 µg/L (in March 2014), 440 µg/L (in September 2014), 630 µg/L (in April 2015), and 1000 µg/L (in May 2017).

These wells are considered likely to represent near-source conditions.

- Phased investigations (i.e. lower spatial resolution passive soil gas (PSG) sampling, followed by higher spatial resolution PSG sampling, followed by active soil gas well installation and sampling) have defined 3 HMAs that, based on existing data, pose a potential threat to groundwater. These HMAs are referred to as the Kietzke HMA, the Prosperity HMA, and the Sunshine HMA. The assessment of a fourth HMA, the Golden HMA, indicates that it does not pose a threat to groundwater. The summary level characteristics and key data gaps for these HMAs are provided below.

- **The Kietzke HMA**:
  - Was identified by a relatively large, contiguous, and robust PSG PCE anomaly
  - Appears to be the source for PCE vapor in the vadose zone that:
    - Exhibits PCE concentrations (as high as 170 mg/m^3) and an estimated PCE vapor mass (that could exceed 100s of pounds) that exceed the defined groundwater threat criteria
    - Exhibits a PCE concentration gradient that increases to the west and which is open-ended in that direction (onto private property)
    - Extends from the near the water table to within 4 feet (or less) of the land surface
    - Appears in part to be derived from a possible source in the vadose zone (to the west) and in part from off-gassing groundwater
    - Is located up gradient from groundwater monitoring wells ARCO6018MW11, CTM127B, and CTM133B.
  - Requires phased investigation to the west (between Kietzke Lane and Gould Street, and north of Mill Street), to extend characterization in that direction to delineate the magnitude and extent of PCE contamination (in soil vapor, soil, and groundwater) in the area where existing data suggest that the center of mass for a significant PCE source may be located. This phased investigation may include (but not be limited to):
    - Phased PSG surveys, with increasing spatial resolution, to define the near-surface extent of the Kietzke HMA
    - Phased installation of ASG monitoring wells to define the lateral and vertical extent of PCE vapor in the vadose zone
    - Soil sampling (may be concurrent with well installation) to assess the distribution of PCE in the vadose and smear zones

- Phased installation of groundwater monitoring wells to delineate the up gradient extent of the Mill/Kietzke PCE groundwater plume and to establish the inter-relationship between PCE in groundwater and any identified PCE source
- Pilot testing to determine feasible remedial alternatives for source (and possibly near-source) PCE mass removal

- **The Prosperity HMA**:
  - Was identified by a local, linear and discontinuous, and relatively weak PSG PCE anomaly that is:
    - in the vicinity of a PCE-using dry cleaner
    - located along a reach of sanitary sewer line where periodic elevated PCE levels have been observed in wastewater since 2000
    - up gradient from a school and community center
  - Is associated with PCE vapor in the vadose zone that:
    - Is generally below the concentration threshold that constitutes a threat to groundwater (with the exception of occasional late-summer seasonal concentrations in ASG-MK01 that barely exceed the defined groundwater threat threshold [of 3.2 mg/m^3])
    - Exhibits a decreasing concentration trend with increasing depth
    - May be associated with a possible near surface source
    - Has not been evaluated at depths greater than 35 feet below ground surface
    - Is spatially associated with groundwater monitoring wells where:
      - PCE has exhibited a generally decreasing trend in CTM13S, from a maximum value of 70 µg/L (in March 2004), to levels typically below the MCL (since late 2011). A spike in concentration (18.9 µg/L) was observed in December 2016.
      - PCE in CTM64 exhibits a very similar pattern to what has been observed in CTM13S, but is at lower concentration. PCE in CTM64 showed a decrease from 6.3 µg/L in March 2004, and was consistently below the MCL through October 2016 (when 0.6 µg/L was observed). PCE in CTM64 increased to 6.39 µg/L in December 2016 (and then decreased to 0.66 µg/L in March 2017).
      - PCE has exhibited a decreasing trend in CTM44, from a maximum value of 34 µg/L (in June 2004), to levels below the MCL (since December 2010).
      - PCE has been below the reporting limit in CTM42 for all but 3 samples (with a maximum concentration of 1 µg/L) since the well was installed and first sampled in early 2003.
  - Does not appear (based on the existing body of data) to constitute a threat to groundwater or to indoor air (as a result of any indoor air intrusion) however, there are some data gaps that need to be addressed in order to verify that is the case. These include:
    - Completing the assessment of the vadose zone from 35 feet bgs to the water table

- Installing nested ASG wells at the east end of Prosperity Street (i.e. at the down gradient end of the Prosperity HMA) to verify that no indoor air intrusion threat is present in that area.

- **The Sunshine HMA**:
  - Was identified by a PSG PCE anomaly along Sunshine Lane that:
    - may be, in part, an eastward continuation of the PCE anomaly associated with the Kietzke HMA
    - appears to be caused, in part, by PCE contributions from a source along Sunshine Lane
    - has been delineated to the north and south
    - has not been delineated to the east and west
  - Is associated with PCE vapor in the vadose zone that:
    - Is generally above the concentration threshold that poses a threat to groundwater in the 10-15 feet bgs depth interval at: ASG-MK06 (seasonally, during late summer); ASG-MK07; and at ASG-MK08
    - Exhibits an increasing concentration trend with decreasing depth at the ASG-MK24, ASG-MK07, ASG-MK25A&B well cluster (with a maximum of 49 mg/m^3 in ASG-MK24 [completed from 4-5 feet bgs] in August 2016) which may indicate a near surface source
    - Has not been evaluated at depths shallower than 10 feet bgs near ASG-MK08
    - Exhibits an increasing concentration trend with increasing depth at the ASG-MK33A&B, CTM134A well cluster (with a maximum of 8.7 mg/m^3 in CTM134A [completed from 39-44 feet bgs] in March 2015) which may indicate an off-gassing groundwater source
    - Is spatially associated with groundwater monitoring wells where:
      - PCE has exhibited seasonally variable concentrations in CTM63, with maximums that are typically less than 30 µg/L (but which have been as high as 75 to 120 µg/L, between 2008 and 2010), and minimums that have typically been below the MCL (at least since 2011).
      - PCE has been as high as 410 µg/L (in June 2014) in CTM134B. PCE in CTM134B exhibits a similar seasonal pattern to what has been observed in CTM63, but is at higher concentration.
      - PCE may reflect:
        - the lateral down gradient movement of contaminated groundwater from the west (i.e. originating at or near the Kietzke HMA)
        - the downward movement of PCE originating in the vadose zone in the Sunshine HMA into groundwater
        - a combination of these (and/or other) processes.
  - Appears to pose a potential threat to groundwater and to indoor air (as a result of indoor air intrusion) however, there are some data gaps that need to be addressed. These include:
    - Completing the assessment of the vadose zone with:

- ASG wells screened from 4-5 feet bgs at ASG-MK06 and ASG-MK08 to further assess the magnitude and extent of the near surface vapors present in ASG-MK24.
- Installing phased ASG wells along the north side of Zinc Street (east of the intersection with Sunshine Lane) to determine subsurface PCE concentrations in that area and the possible eastern extent of the Sunshine HMA.
- Other phased ASG wells (if needed) to indicate the presence and center of mass location for any PCE source that poses a threat to groundwater.

- Continuing the assessment of groundwater in this area by:
  - Evaluating the possible inter-relationships between the PCE in CTM63 and CTM134B (and any new groundwater monitoring wells installed as part of this effort) and PCE vapor in nearby ASG wells as part of determining whether or not a significant PCE source is likely to be present in this HMA.
  - Installing a nested smear zone/groundwater monitoring well pair on Zinc Street, along the broader CTM127A&B-CTM133A&B-CTM134A&B trend for the Mill/Kietzke PSA.

Potential Source Area 2 – The Vassar/E. Plumb PSA

The Vassar/E. Plumb PSA (Figure 3) is located in central Reno, proximal to the up gradient portion of the South Reno groundwater PCE plume. This PSA is transected by major arteries (S. Virginia Street and Plumb Lane) and has had variable land use over time (including both commercial, light industrial, and residential activity). Numerous potentially contributory activities (PCAs, both historical and current) have been identified in this PSA. Two prior regulatory corrective actions associated with PCE impacts to the environment at 2 PCAs (one former and one active dry cleaner site) have taken place in this PSA. Five PCE high mass areas (HMAs) have been defined in this PSA based on passive soil gas (PSG) data. Two of these HMAs coincide with the former PCE-related regulatory corrective sites.

Work to date in and around the Vassar/E. Plumb PSA has resulted in the following determinations/characterizations:

- The geologic materials occurring in the shallow subsurface in the Vassar/E. Plumb PSA consist of unconsolidated, heterogeneous, coarse to fine grained, fluvial and glacio-fluvial sediments.
- The central Truckee Meadows is underlain by a complex aquifer system. While this system can be generally characterized as heterogeneous and unconfined, it can locally exhibit confined to leaky confined behavior. In the central portion of the Vassar/E. Plumb PSA, there is a persistent upward gradient between the deep zone of the aquifer system and the shallow zone unconfined water table.
- Shallow zone groundwater in the vicinity of the Vassar/E. Plumb PSA occurs at a depth of 15 to 30 ft. bgs. Groundwater elevation can fluctuate in response to municipal water supply well pumping and to longer term changes in response to trends in precipitation and overall

groundwater demand.

- Groundwater in the vicinity of the Vassar/E. Plumb PSA is also subject to the influence from municipal water supply wells. There are PCE-impacted municipal water supply wells (completed in the deep zone) that exert a hydraulic influence on groundwater in this PSA. These wells are located approximately 5000 feet to the north (the High Street well, with a capacity of 1900 gpm) and approximately 5000 feet to the east (the Corbett well, with a capacity of 1400 gpm).
- PCE concentration in groundwater from wells in and around the Vassar/E. Plumb PSA is both spatially and temporally variable. Monitoring well data define discrete groundwater "hot spots" where shallow zone PCE concentration has been persistently elevated relative to the rest of the South Reno Plume. These include are referred to as the Vassar Street hot spot wells.
  - PCE in Vassar Street hot spot wells has:
    - Been as high as 170 µg/L (in 12/2003) in CTM48. PCE is CTM48 was 100 µg/L in 6/2005 but has otherwise been near the MCL since 2009.
    - Been as high as 120 µg/L (in 9/2004 and 9/2012) in CTM62. A generally increasing concentration trend was present in this well between 2003 and 2013. This has been followed by a generally decreasing trend since.
    - Been as high as 495 µg/L (in 3/2016) in VP27B. Otherwise, PCE in VP27B has varied between 38.1 to 170 µg/L and exhibits no apparent trend (since the first samples collected in 3/2014).

  These persistent groundwater hot spots are interpreted to represent potential near-source conditions.

  - Phased (i.e. lower spatial resolution followed by higher spatial resolution) passive soil gas (PSG) sampling defined 5 locations in this PSA where elevated PCE mass was present in the shallow subsurface. These high mass areas (HMAs) were named the Arroyo HMA, the Casazza HMA, the Wonder HMA, the Wrondel HMA, and the Cadillac HMA. The summary level characteristics and key data gaps for these HMAs are provided below.
    - The Arroyo HMA was defined by relatively extensive and locally spotty PSG PCE anomaly. Based on the distinct characteristics present on opposite sides of the Virginia Lake Fault Zone (VLFZ), this HMA has been further subdivided into the Arroyo West HMA and Arroyo East HMA.

      - **<u>The West Arroyo HMA</u>** may contain a source for PCE vapor in the vadose zone that:
        - Exhibits PCE concentrations (up to 9.9 mg/m^3) that locally (only in ASG-VP06) and seasonally (only in late summer) exceed the groundwater threat threshold of 3.2 mg/m^3.
        - Shows no indication of increasing concentration trends.
        - Has not been assessed at depths greater than 5 feet bgs
        - Is present in an area where the actual depth to groundwater is unknown (but currently estimated to be less than 8 feet bgs, based on the water level data from CTM50)
        - Is present in an area where actual groundwater PCE concentration

is unknown.
- Does not appear to represent a significant threat to groundwater based on the existing data. However this HMA warrants a groundwater monitoring well (in the vicinity of ASG-VP06 and ASG-VP10) to assess groundwater conditions.

- **The East Arroyo HMA** may contain multiple sources for PCE vapor in the vadose zone that:
  - Exhibits PCE concentrations in the south alley (i.e. the "south alley source", located in the alley between Pueblo and Arroyo Streets) that dramatically exceed the groundwater threat threshold in ASG-VP27B (where 376 mg/m^3 was observed in 2/2016) and ASG-VP12 (where 187 mg/m^3 was observed in 8/2016).
    - This potential PCE source requires additional characterization with wells:
      - At ASG-VP12 to assess PCE concentration from 4-5 ft. bgs, 15-20 ft bgs, and 25-30 ft bgs.
      - On Holcomb Avenue (between Arroyo Street and the south alley) to define the lateral and vertical extent of PCE in soil vapor and groundwater northwest of the ASG-VP27A&B well cluster.
      - At ASG-VP22 to assess PCE concentration from 15-20 ft bgs and 25-30 ft bgs.
      - At ASG-VP08 to assess PCE concentration from 15-20 ft bgs and 25-30 ft bgs.
  - Occurs on Broadway Boulevard at the ASG-VP09, VP30, VP31A&B well cluster (where maximum PCE concentration has been 6.7 mg/m^3 [in ASG-VP31B in 2015 Q1]). This location may be a distinct and separate source or an eastward, down gradient, continuation of the south alley source.
    - This potential PCE source (or continuation of the south alley source) requires additional characterization with wells:
      - Near the NE corner of the intersection of S. Wells Avenue and Broadway Boulevard to assess PCE concentration from 5-10 ft bgs, 15-20 ft bgs, and 25-30 ft bgs.
  - Occurs in ASG-VP04 at a location that is apparently separate and distinct from the south alley source. ASG-VP04 is a single ASG well (completed from 5-10 feet bgs, located approximately 100 feet north of groundwater monitoring well CTM48) where PCE vapor concentrations above 3.2 mg/m^3 are common.
    - Requires additional characterization with wells:
      - Near ASG-VP04 to assess PCE concentration from 15-20 ft bgs and 25-30 ft bgs.

- **The Casazza HMA** may contain a source for PCE vapor in the vadose zone that:
  - Exhibits PCE concentrations (up to 6.2 mg/m^3in ASG-VP14; up to 5.8

mg/m^3in ASG-VP16; and, up to 8.6 mg/m^3in ASG-VP23A) that typically exceed the groundwater threat threshold of 3.2 mg/m^3.
- Shows an apparent weak decreasing trend.
- Occurs in an area where the approximate depth to water is 20 to 24 feet bgs.
- Is spatially associated with a maximum groundwater PCE concentration of 2.2 µg/L in well ASG-VP23B.
- Does not appear to represent a significant threat to groundwater based on the existing data. However this HMA warrants: 1) additional ASG wells (screened from 10-15 feet bgs) to the north of ASG-VP14 and south of ASG-VP16; and, 2) a down gradient groundwater monitoring well (in the vicinity of ASG-VP15) to assess groundwater conditions.

- The assessment of the Wonder HMA indicates that there is no apparent PCE source that poses a threat to groundwater at this location.
- The Wrondel HMA is spatially associated with Plumb Lane Plaza (the site of a NDEP PCE-related corrective action that received a no further action determination in January 2016).
- The Cadillac HMA is spatially associated with Orchard Plaza (the site of a NDEP PCE-related corrective action that received a no further action determination in November 2015).

Potential Source Area 3 – The West Fourth Street PSA

The West Fourth Street PSA (Figure 4) is located in central Reno, proximal to the up gradient portion of the Downtown Reno groundwater PCE plume in the shallow zone of the aquifer system. This PSA is transected by major arteries (Fourth Street [old Highway 40] and Virginia Street) and has had variable land use over time (including both commercial, light industrial, and residential activity). Numerous potentially contributory activities (PCAs, both historical and current) have been identified in this PSA. Five PCE high mass areas (HMAs) have been defined in this PSA based on passive soil gas (PSG) data. An ongoing regulatory corrective action that involves PCE in shallow zone groundwater has been taking place at Harrah's, in the southeast quadrant of this PSA. Two previous regulatory corrective actions that involved PCE took place; one at a (now former) dry cleaner location, and another in association with a construction project.

Work to date in and around the West Fourth Street PSA has resulted in the following determinations/characterizations:

- The geologic materials occurring in the shallow subsurface in the West Fourth Street PSA consist of unconsolidated, heterogeneous, coarse to fine grained, fluvial and glacio-fluvial sediments.
- The central Truckee Meadows is underlain by a complex aquifer system. While this system is generally characterized as heterogeneous and unconfined, it can locally exhibit confined to leaky confined behavior. Aquifer system characteristics in the West Fourth Street PSA are predominantly heterogeneous unconfined. In the West Fourth Street PSA, a downward vertical gradient is present between the shallow zone unconfined water table and the deep zone where municipal water supplies wells are completed. This downward gradient typically

increases when municipal water supply well pumping from the deep zone is taking place.

- Shallow zone groundwater within the West Fourth Street PSA occurs at depths that can vary from 10 to 56 ft bgs. Variations in depth to water can reflect: proximity to the Truckee River; local topography; perched water and/or a local source of recharge; and, the seasonal effects of municipal water supply well pumping. Longer term changes in depth to groundwater occur in response to trends in precipitation, Truckee River flows, and groundwater demand.
- Groundwater in the vicinity of the West Fourth Street PSA is subject to the influence from municipal water supply wells. There are PCE-impacted municipal water supply wells (completed in the deep zone) that exert a hydraulic influence on groundwater in this PSA. These wells are: located within and near the southeast corner of this PSA (the High Street well, with a capacity of 1400 gpm); approximately 1500 feet to the east (the Morrill Avenue well, with a capacity of 1400 gpm); approximately 4500 feet to the east (the 4TH Street well, with a capacity of 1200 gpm); approximately 4000 feet to the east (the Kietzke Lane well, with a capacity of 2050 gpm); and, approximately 800 feet to the southwest (the Reno High well, with a capacity of 2250 gpm).
- PCE concentration in groundwater from wells in and around the West Fourth Street PSA is both spatially and temporally variable. There is a relatively large area within which monitoring well data roughly define a groundwater "hot spot" where shallow zone PCE concentration has been elevated over time relative to the rest of the wells in what has been defined as the shallow zone portion of the Downtown Reno plume. These include wells CTM3, CTM5, CTM28S, CTM129, and QUIKMRTMW18C. Considering the spatial distribution of these wells, it is possible that this hot spot is not contiguous and that the PCE in groundwater in these wells may have originated from multiple sources.
    - PCE in well QUIKMRTMW18C has been as high as 280 µg/L. Concentrations in this well exhibit a variable but generally decreasing long term trend.
    - PCE in well CTM28S has been as high as 260 µg/L. Concentrations in this well exhibit a variable but generally decreasing long term trend.
    - PCE in well CTM129 has been as high as 130 µg/L. Concentrations in this well exhibit a variable but generally decreasing long term trend.
    - PCE in CTM3S has been as high as 64.2 µg/L. Concentrations in this well have been variable over time and exhibit no trend.
    - PCE in well CTM5 has been as high as 40 µg/L. Concentrations in this well exhibit a decreasing trend through 2015 but show signs of a potentially increasing trend since then.

  The PCE concentrations in these wells may represent potential near-source conditions.
- Phased (i.e. lower spatial resolution followed by higher spatial resolution) passive soil gas (PSG) sampling has defined 5 locations in this PSA where relatively elevated PCE mass is present in the shallow subsurface. These high mass areas (HMAs) are referred to as the W. Fifth HMA, the Keystone Place HMA, the Ralston and Commercial HMA, the N. Virginia HMA, and the E. Sixth and Record HMA. The summary level characteristics and key data gaps for these HMAs are provided below.

- **The W. Fifth HMA** was defined by a discontinuous and linear set of PSG anomalies that occur along W. Fifth Street, between Keystone Avenue and Washington Street. These anomalies appear to decrease in magnitude from west (up gradient) to east (down gradient) and occur in an area where one current and four historical dry cleaners are located. This HMA may contain a source or sources for PCE vapor in the vadose zone that:
    - Exhibits PCE concentrations (up to 4.7 mg/m^3in ASG-W402; up to 6.7 mg/m^3in ASG-W401; and, up to 35 mg/m^3in CTM128) that increase with increasing depth.
    - That typically exceed the groundwater threat threshold of 3.2 mg/m^3 in wells (ASG-W401 and CTM128) screened at depths greater than 21.2 feet bgs
    - Shows an apparent weak decreasing temporal trend.
    - Occurs in an area where the approximate depth to water is 36 to 47 feet bgs.
    - Is spatially associated with a maximum groundwater PCE concentration of 130 µg/L in well CTM129.
    - Is located up gradient from maximum groundwater PCE concentrations of 260 and 280 µg/L (in wells QUIKMRTMW18C and CTM28S, respectively).
    - Have not been evaluated further, in the area along W. Fifth Street between Keystone Avenue and Washington Street, subsequent to the completed phased PSG survey. This HMA warrants:
        - Additional (clustered) ASG monitoring wells, screened in discrete intervals from near the land surface into the smear zone, in the area along W. Fifth Street between Keystone Avenue and Washington Street.
        - Groundwater monitoring wells (screened below the smear zone) located along W. Fifth Street between CTM1S and CTM129.

- **The Keystone Place HMA** was defined by a relatively weak PSG anomaly that appears
to be located along Keystone Place where it crosses Second Street, between Keystone Avenue and Gardner Street. This anomaly occurs near an historical dry cleaner location. This HMA may contain a source for PCE vapor in the vadose zone that:
    - Has not been assessed with ASG monitoring wells.
    - Occurs in an area where the approximate depth to groundwater varies from 17 to 42 feet bgs
    - Is down gradient from groundwater monitoring well CTM29S (where PCE has been at or below the reporting limit) and up gradient from CTM2S (where a maximum PCE concentration of 22 µg/L has been observed).
    - Has not been evaluated further, subsequent to the completed phased PSG survey. This HMA warrants:
        - One (or more) set of clustered ASG monitoring wells, screened in discrete intervals from near the land surface into the smear zone, near the intersection of Keystone Place and Second Street.
        - One or more groundwater monitoring wells (screened below the smear zone) in the event that the results from the ASG wells indicate that a threat to groundwater is present.

- **The Ralston and Commercial HMA** was defined by a discontinuous and linear PSG anomaly that occurs along an approximately 500 foot long stretch of Ralston Street, roughly centered on Third Street (Commercial Way). This HMA may contain a source for PCE vapor in the vadose zone that:
    - Has not been assessed with ASG monitoring wells.
    - Occurs in an area where the approximate depth to groundwater varies from approximately 26 to 37 feet bgs.
    - Is spatially associated with groundwater monitoring well RETRACB14 (where a maximum PCE concentration of 10 µg/L has been observed) and is up gradient from Groundwater monitoring wells RETRACMWE and RETRACMWE1 (where maximum PCE concentrations of 44 µg/L and 37 µg/L, respectively, have been observed).
    - Has not been evaluated further, subsequent to the completed phased PSG survey. This HMA warrants:
        - Clustered ASG monitoring wells, screened in discrete intervals from near the land surface into the smear zone:
            - Near the intersection of Ralston and Third
            - North and south of the intersection of Ralston and Third
            - Along Third Street, east of Ralston
        - One or more groundwater monitoring wells (screened below the smear zone) in the event that the results from the ASG wells indicate that a threat to groundwater is present.

- **The N. Virginia HMA** was defined by a discontinuous PSG anomaly located along N. Virginia Street, on either side of Sixth Street. The portion of this anomaly located north of Sixth Street is near two historical dry cleaner locations. This HMA may contain a source for PCE in the vadose zone that:
    - Has not been assessed with ASG monitoring wells.
    - Occurs in an area where the depth to groundwater is estimated to be approximately 33 to 42 feet bgs.
    - Is down gradient from groundwater monitoring wells CTM3S (where a maximum PCE concentration of 64.2 µg/L has been observed) and CTM31S (where a maximum PCE concentration of 22 µg/L has been observed).
    - Has not been evaluated further, subsequent to the completed phased PSG survey. This HMA warrants:
        - Clustered ASG monitoring wells, screened in discrete intervals from near the land surface into the smear zone:
            - Along N. Virginia Street, north of Sixth Street
            - Along N. Virginia Street, south of Sixth Street
        - One or more groundwater monitoring wells (screened below the smear zone) in the event that the results from the ASG monitoring wells indicate that a threat to groundwater is present.

- **The E. Sixth and Record HMA** was defined by an irregular and discontinuous PSG anomaly located: along Evans Avenue (north of Sixth Street); on Record Street (near the east-west alley [i.e. the "north alley" between and parallel to Seventh and Eighth Streets); along Valley Road (between Eighth and Fifth Streets); along the north alley

(between Record Street and Valley Road); along Seventh Street (east of Valley Road); along Seventh Street (between Record Street and Valley Road) and, along Sixth Street (between Evans Avenue and Valley Road). There is one historical dry cleaner located at the southwest corner of Sixth Street and Valley Road. This HMA may contain a source or sources for PCE in the vadose zone that:

- Has not been assessed with ASG monitoring wells.
- Occurs in an area where the depth to groundwater is estimated to be approximately 24 to 35 feet bgs
- Is up and cross gradient from monitoring well CTM6S (where a maximum PCE concentration of 36 µg/L has been observed).
- Has not been evaluated further, subsequent to the completed phased PSG survey. This HMA warrants:
    - Clustered ASG monitoring wells, screened in discrete intervals from near the land surface into the smear zone:
        - At or near the intersection of Evans Avenue and Sixth Street
        - At or near the intersection of Record Street with the north alley
        - On Seventh Street, east of Valley Road
        - On Seventh Street, near the W4-277 PSG module location
        - On Valley Road near the W4-288 PSG module location
        - On Valley Road, mid-way between Fifth and Sixth Streets
    - Groundwater monitoring wells (screened below the smear zone) in any areas where the results from the ASG monitoring wells indicate that a threat to groundwater is present.

4. PROJECT ACTIVITIES

The scope of work for each potential source area will likely include, but may not be limited to, the following tasks:

Task 1. Data Review.
In close collaboration with WCCSD, the Firm will review existing data. A summary of existing data will be presented and provided by the WCCSD. Based on that summary, additional data can be provided to the Firm. The results of this review will determine the specific additional data needed to advance HMA characterization and evaluation and meet project objectives. The identified specific data needs and agreed upon approach for data acquisition will be summarized in a technical memorandum.

Task 2. Refinement of Data Acquisition Activities
In close collaboration with WCCSD, the Firm will review the proposed data acquisition activities with other program stakeholders (e.g. Reno, NDEP, WCHD) and incorporate any substantial comments received and/or required revisions to the proposed data acquisition activities. Any refinements to data acquisition activities will be documented in an addendum to the technical memorandum created in Task 1.

Task 3. Implementation of Data Acquisition Activities.
In close collaboration with WCCSD, the Firm will perform (or supervise subcontractors to perform, as appropriate) the data acquisition activities identified through the completion of Task

2. Activities to be performed during data acquisition may include (as appropriate and effective) but not be limited to some or all of the following:

1) Permitting
2) Subcontractor coordination
3) Advising residents and business owners of data gathering activities (that may be noisy or disruptive to normal traffic patterns)
4) Passive soil gas sampling
5) Active soil gas sampling
6) Soil and/or groundwater sampling
7) Drilling (using rotosonic methods), borehole logging, well construction and sampling of active soil gas monitoring wells
8) Drilling (using rotosonic methods), borehole logging, well construction and sampling of groundwater monitoring wells
9) Depth-discrete sampling (of soil, soil gas, and/or groundwater) during drilling
10) Purge and/or pilot testing
11) IDW disposal

Data review and acquisition activities may be phased and/or iterative as needed and as appropriate.

Task 4. Data Evaluation, Report Preparation, and Participation in Stakeholder Meetings.

In close collaboration with WCCSD, the Firm will evaluate the data generated during Task 3 (in light of the pre-existing data), and will prepare one or more technical memoranda presenting the methodology, findings, conclusions, and recommendations based on those results. Data evaluation and reporting will include (but may not be limited to) the following:

1) A concise summary of the data gaps being addressed
2) A concise summary of the data acquisition approach and methodology(ies) employed to address those data gaps
3) A data quality assurance review and validation of the new data
4) An assessment of new data usability based on data quality criteria and data quality objectives
5) Preparation of final boring and well construction logs in a manner consistent with the CTMRD standard using LogPlot (or an equivalent software)
6) The evaluation of soil, soil gas, and/or groundwater data with respect to the project objectives
7) Development and/or refinement of the conceptual site model for each high mass area
8) A quantitative assessment of the potential threat to groundwater resources associated with each high mass area (where ASG data allow, based on maximum concentration and total mass criteria)
9) Prioritizing each high mass area (and apparent sources within a given HMA) based on the potential threat to groundwater
10) Recommendations for additional characterization, remedial investigation and/or feasibility study activities
11) Identifying specific land parcels where PCE contamination sources that threaten groundwater appear to be located based on the collective body of available data
12) Participate in technical meetings with WCCSD where these results, conclusions, and recommendations will be discussed and evaluated
13) Collaboratively participate with WCCSD in meetings where results, conclusions, and

recommendations will be presented to, and discussed with, stakeholders

Data evaluation, interpretation, reporting, and meeting activities may be phased and/or iterative as needed and appropriate.

5. SOQ CONTENT (Total Evaluation Score = 100 points)

To be considered, prospective consultants shall submit a SOQ to WCCSD. The SOQ shall include the following:

1) Firm Qualifications (30% of total evaluation score)
   a) Describe the Firm's qualifications to perform the work, based on actual experience and successful completion of comparable projects.
   b) Describe the Firm's capabilities and experience to support site characterization where chlorinated organic solvents are the constituent of concern.
   c) Describe the Firm's capabilities to support the identification and mitigation of threats to groundwater from chlorinated organic compounds in the shallow subsurface.
   d) Describe the Firm's capabilities with respect to data-driven decision making in support of characterization, remedial investigation and remedial feasibility for chlorinated organic compound impacts that impact or threaten groundwater.
   e) Limit the Firm Qualifications section of the SOQ to a maximum of three (3) pages. Familiarity and experience with methods appropriate to conditions in the central Truckee Meadows and with the agencies and regulatory requirements relevant to projects in southern Washoe County, Nevada will be considered a benefit.

2) Project Team (40% of total evaluation score)
   a) Describe the pertinent knowledge, skill, ability, location, and experience of the project manager and key discipline team members. Project management by a Nevada Certified Environmental Manager (CEM) with direct and relevant experience will be considered an advantage.
   b) Include only those who will actually comprise the project team (clearly indicating their relevant experience, location, availability for, and intended contribution to this project). Given that this will be a collaborative project with WCCSD, readily accessible key team members and an organizational structure that promotes: effective and proactive communication; and, timely completion of deliverables is considered by WCCSD to be essential. Provide a project organizational structure that reflects this. If key discipline team members are not local, and would require travel in order to participate, clearly identify those team members and indicate how (and on what basis) the Firm would expect travel costs to be accommodated.
   c) Limit the Project Team section to a maximum of five (5) pages. Directly relevant project experience, and familiarity with methods appropriate to conditions in the central Truckee Meadows and familiarity with the agencies and regulatory requirements pertaining to similar projects in southern Washoe County, Nevada will be considered an advantage.
   d) Resumes of key project personnel can be included in a separate Appendix. Limit individual resumes to a maximum of three (3) pages.

3) Related Work (30% of total evaluation score)

a) Clearly identify directly relevant work performed by the key discipline team members during the past five (5) years. This should demonstrate that they have played a role equivalent to their role in your SOQ. This should demonstrate sufficient experience in a key role in site characterization and remediation with a focus on volatile organic compounds (particularly chlorinated organic solvents), and mitigating threats to groundwater resources. For the projects identified, give a brief description of the project, list the key discipline team member participants and their specific roles in these projects, the scope of services provided, project cost, project schedule, and project outcome.
b) Identify all work the firm has conducted: (1) for Washoe County in the past five (5) years; and, (2) in Washoe County in the past 5 years. For the projects identified, give a brief description of the project, identify any team member participants and their specific roles in these projects, the scope of services provided, project cost, project schedule, and project outcome.
c) Include names, titles, affiliations, and contact information (telephone numbers and/or email address) for a minimum four (4) references that are familiar with the capabilities and performance of the key team members on relevant projects where they have played a significant role comparable to the role put forth in your SOQ.
d) Limit the Related Work section to a maximum of three (3) pages.
e) Key project descriptions can be included as an Appendix. Limit individual project descriptions to no more than one (1) page.

6. SELECTION AND CONTRACTING PROCESS

The chosen Firm shall demonstrate a thorough understanding of the technical and non-technical issues to be addressed during this project. The Firm shall also demonstrate that they possess adequate and appropriate resources to complete this project in accordance with the County's expectations.

A selection committee will be established to participate in the consultant selection process and to provide technical information, assistance, and general policy advice to the candidate firms throughout the course of the selection process.

It is anticipated that the selection committee will identify the most qualified firm or firms based on an evaluation of the SOQs and using the criteria listed in Section 5. Washoe County reserves the right to select the top ranked Firm based solely on the written SOQs. Presentations and interviews may be requested from the most qualified firms if the SOQ evaluation indicates that there is more than one most qualified firm. Scoring of presentations and interviews will be based upon the same criteria used for the written submittals. If interviews are held, the interview evaluations will be used to determine the top-ranked Firm. Given that there are three separate potential source area projects, Washoe County reserves the right to pursue contracts with multiple firms if at the end of the selection process more than one top-ranked Firm has been determined.

Washoe County staff will then attempt to negotiate a scope of services and fee contract with the top-ranked Firm(s). If a scope of services and fee cannot be agreed upon with the top Firm, County staff will attempt to negotiate the scope of services and fee contract with the second rated Firm and so on. The negotiated scope(s) of service and fee contract(s) will then be presented to

the Washoe County Board of Commissioners for approval. The specific timetable for completion of the work will be included in the contract based upon the negotiated scope of services.

Partial SOQs will not be accepted. Requests for clarifications or for additional information regarding the Request for Qualifications must be submitted in writing (email is preferred) to Washoe County no later than 4:00 PM (PST) on December 15, 2017. Submit questions and requests for clarification or supplementary information to:

Washoe County Community Services Department
CTMRD Program
Attention: Chris Benedict
1001 E. Ninth Street, Building C, Room C130
Reno, Nevada 89512
cbenedict@washoecounty.us

The County reserves the right to reject any and all SOQs, modify the scope of work or services to be provided, withhold award of contract for any reason it may determine, waive or decline to waive any technicalities or irregularities in any proposal, and require additional written and/or verbal presentations, if necessary.

Washoe County retains the right to use any information, data or ideas presented in SOQs submitted in response to this Request for Qualifications. The submission of an SOQ in response to this Request for Qualifications constitutes the waiver of any claim to compensation for the use of information, data, or ideas contained in such proposals.

Washoe County has established specific indemnification and insurance requirements for agreements/contracts with consultants, engineers and architects to ensure that adequate insurance coverage is maintained. Indemnification and hold harmless clauses are intended to assure that consultants, engineers and architects accept and are able to pay for the loss or liability related to their activities. Project-specific insurance provisions will be required for all contractors and subcontractors. General insurance provisions and a standard Washoe County professional services contract will be made available for review upon request.

7. BUDGETED FUNDS

The actual budget for work in each PSA will be determined through development of the scope of work by the Firm and negotiations between Washoe County and the Firm. It is anticipated that the total budget for this phase of each PSA project will be on the order of $300,000 - $400,000. This estimated budget will include all analytical services costs for soil, PSG, ASG, and/or groundwater analysis. It is strongly suggested that analytical services be provided using service providers currently under contract to WCCSD or that have been commonly used by WCCSD. WCCSD will work closely with the selected firm(s) to determine the appropriate budget amount after a scope of work has been developed.

8. TERM

The term of the Agreement to be awarded under this RFQ is anticipated to be 18 months and is expected to begin upon the approval of the award (estimated award date March 27, 2018).

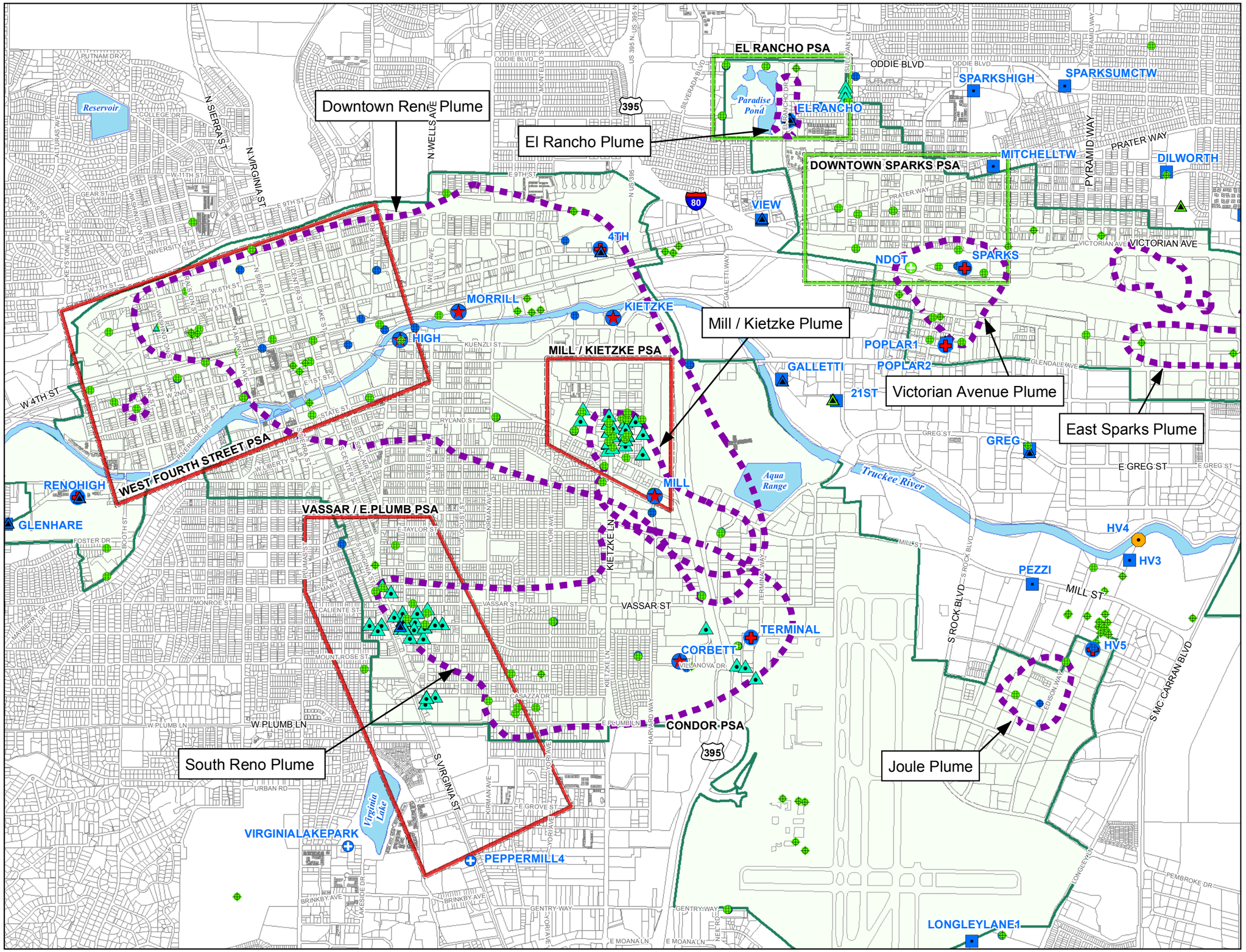
Actual work under the Agreement shall not begin until written notice to proceed is received from Washoe County.

9. SCHEDULE

The award process will be conducted according to the following tentative schedule. This tentative schedule may be altered at any time at the discretion of Washoe County.

Advertisement Date/RFQ Solicitation Package Released	12/1/2017
Written Questions Must Be Received by 4:00 PM (PDT)	12/15/2017
Written Responses to Questions Provided by Washoe County	12/22/2017
Statement of Qualifications Received by 2:00 PM (PDT)	1/12/2018
Interviews Conducted With Highest Ranked Firms	Week of 1/22/2018
Begin Negotiations with Most Qualified Firm(s)	Week of 1/29/2018
Signed Contract Received from Most Qualified Firm(s)	2/26/2018
Anticipated Approval of Award by County	3/27/2018

Figure 1 - Potential PCE Source Area Investigation



Potential Source Area (PSA) Boundary of Interest Here

Other Potential Source Area (PSA) Boundary

PCE Plume Outlines

CTMRD Contaminant Boundary

Well Type Symbology

- MONITORING - WCCSD
- MONITORING - TMWA
- MONITORING - OTHER
- PRODUCTION - TMWA
- *PCE TREATED PRODUCTION - TMWA*
- PRODUCTION - OTHER
- DOMESTIC
- DEEP ZONE WELL
- SHALLOW ZONE WELL
- ABANDONED WELL
- INDUCTION WELL

Central Truckee Meadows Remediation District Program

November 2017

NOTE: The scale and configuration of all information shown hereon are approximate only and are not intended as a guide for design or survey work. Reproduction is not permitted without prior written permission from Washoe County Community Services Department.

1 inch = 2,000 feet

0 1,000 2,000 Feet

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Figure 2 - Mill / Kietzke Potential Source Area (PSA)

Drycleaner Active 1985 to Present

Mill \ Kietzke Plume

KIETZKE HMA

PROSPERITY HMA

SUNSHINE HMA

GOLDEN HMA

ASG-MK18
CTM131A & B
ASG-MK19
GOULD ST
CTM104
CTM10D
CTM103
CTM9S
ASG-MK30
CTM64
CTM13S
PROSPERITY ST
ASG-MK02
CTM42
ASG-MK16
ASG-MK29A & B
CTM132A & B
ASG-MK20A & B
ASG-MK01
ASG-MK21
ASG-MK22A & B
SUNSHINE LN
ASG-MK03
ASG-MK31A & B
ASG-MK23
ASG-MK32A & B
ASG-MK17
ASG-MK04
ASG-MK13A & B
KIETZKE LN
CTM127A & B
ASG-MK28A & B
ASG-MK06
ASG-MK25A & B
CTM63
ASG-MK07
ASG-MK05
ASG-MK14A & B
CTM133A & B
ASG-MK24
CTM134A & B
ASG-MK08
ASG-MK33A & B
CTM130A & B
ASG-MK15A & B
ASG-MK15C & D
ASG-MK33A
ZINC ST
GOLDEN LN
ASG-MK09
ASG-MK26
ASG-MK11
ARCO6018MW11
ASG-MK10
ASG-MK27
ASG-MK12
ARCO6018MW12
MILL ST
DAYTON WAY
STEWART ST
ARCO6018MW8
4410

PCE Plume Outline

Groundwater Flow Direction (Shallow Zone)

Water Level Elevation Contour (Shallow Zone)

Color Contoured PCE Passive Soil Gas (PSG) Data

January 2003 PSG Boring Locations

Phase 1 PSG Survey Locations (March 2009)

Phase 2 PSG Survey Locations (September 2009)

Sanitary Sewer with Flow Direction

Stream

Ditch / Slough

PCE High Mass Areas (HMA, Defined by PSG Data)

CTMRD Contaminant Boundary

PCE Detected in Sewer (> 100 µg/L) Downstream from PCE-using Business

Current PCE Corrective Action Site

Former PCE Corrective Action Site

Potential PCE Using Businesses

- Dry Cleaner (Current)
- Dry Cleaner (Historical)
- Auto Repair
- Auto Paint
- Fleet Repair
- Chemical Manufacturer
- Paint Shop

Well Type Symbology

- MONITORING - WCCSD
- MONITORING - TMWA
- MONITORING - OTHER
- PRODUCTION - TMWA
- *PCE TREATED PRODUCTION - TMWA*
- ACTIVE SOIL GAS WELL - WCCSD
- PRODUCTION - OTHER
- DOMESTIC
- DEEP ZONE WELL
- SHALLOW ZONE WELL
- ABANDONED WELL
- INDUCTION WELL

Central Truckee Meadows Remediation District Program

November 2017

1 inch = 150 feet

0 125 250 Feet

Figure 3 - Vassar / East Plumb Potential Source Area (PSA)

Drycleaner Active 1950 to Present
Drycleaner Active 1965 to 1995
Drycleaner Active 1935 to 1945
Drycleaner Active 1961 to 2005
Drycleaner Active 1970 to Present
Drycleaner Active 1960 to 1991
Drycleaner Active 1946 to 1975
Drycleaner Active 1960 to 1970
Drycleaner Active 1970 to 1975
Drycleaner Active 1965 to 1995
Drycleaner Active 1985 to Present
Drycleaner Active 1970 to 2000
Drycleaner Active 1986 to 2006
Drycleaner Active 2000 to Present
Drycleaner Active 1960 to 2006
South Reno Plume
WONDER HMA
ARROYO HMA
CASAZZA HMA
WRONDEL HMA
CADILLAC HMA
COCHRAN DITCH
COCHRAN DRAIN
Virginia Lake
CTM14S
CTM27D
CTM15S
CTM49
CTM50
CTM47
CTM48
CTM46
CTM62
HOLCOMBAVMW
CTM41S
CTM60
CTM52
CTM53
CTM51
CTM95
CTM96
CTM94
CTM16S
USGSLISTON
CTM45
CHENEY ST
E TAYLOR ST
BURNS ST
CLAREMONT ST
BRESSON AVE
WONDER ST
VASSAR ST
BRENTWOOD DR
CAPITOL HILL AVE
GRAND CANYON BLVD
COLORADO RIVER BLVD
CASAZZA DR
E PLUMB LN
W PLUMB LN
MARGRAVE DR
APPLE ST
E GROVE ST
W GROVE ST
LINDEN ST
HUBBARD WAY
CADILLAC PL
HILLCREST DR
WALTS LN
MALONE LN
W ARROYO ST
W PUEBLO ST
MOUNT ROSE ST
SUNSET DR
BONNIE BRIAR PL
ORNINGSIDE DR
COUNTRY CLUB DR
AUDUBON WAY
TAHOE ST
S CENTER ST
HOLCOMB AVE
S VIRGINIA ST
WHEELER AVE
S WELLS AVE
WILSON AVE
LOCUST ST
KIRMAN AVE
EDELWEISS ST
HELVETIA AVE
WILKINSON AVE
BATES AVE
PRINCESS AVE
YORI AVE
FOREST ST
MARY ST
KNOLL DR
WATT ST
ORDWAY AVE
OAKHURST AVE
LAKESIDE DR
HIDDEN CREST DR
4460
4450
4440
4430
4420
22.803
15.743
10.869
7.504
5.181
3.577
2.469
1.705
1.177
0.813
0.561
0.387
0.267
0.185
0.127
0.088
0.061
0.042
0.029
0.020
0.014
PCE [µg]

Approximate PCE Plume Outline
Groundwater Flow Direction (Shallow Zone)
Water Level Elevation Contour (Shallow Zone)
Color Contoured PCE Passive Soil Gas (PSG) Data
Phase 2 PSG Survey Locations (December 2009)
Phase 1 PSG Survey Locations (March 2009)
Virginia Lake Fault Zone
Discrete Hydraulic Discontinuity

PCE High Mass Areas (HMA, Defined by PSG Data)
CTMRD Contaminant Boundary
PCE Detected in Sewer (> 100 µg/L) Downstream from PCE-using Business
Current PCE Corrective Action Site
Former PCE Corrective Action Site
Stream
Ditch / Slough
Sanitary Sewer with Flow Direction

Potential PCE Using Businesses

- Dry Cleaner (Current)
- Dry Cleaner (Historical)
- Auto Repair
- Auto Paint
- Fleet Repair
- Chemical Manufacturer
- Paint Shop

Well Type Symbology

- MONITORING - WCCSD
- MONITORING - TMWA
- MONITORING - OTHER
- PRODUCTION - TMWA
- *PCE TREATED PRODUCTION - TMWA*
- ACTIVE SOIL GAS WELL - WCCSD
- PRODUCTION - OTHER
- DOMESTIC
- DEEP ZONE WELL
- SHALLOW ZONE WELL
- ABANDONED WELL
- INDUCTION WELL

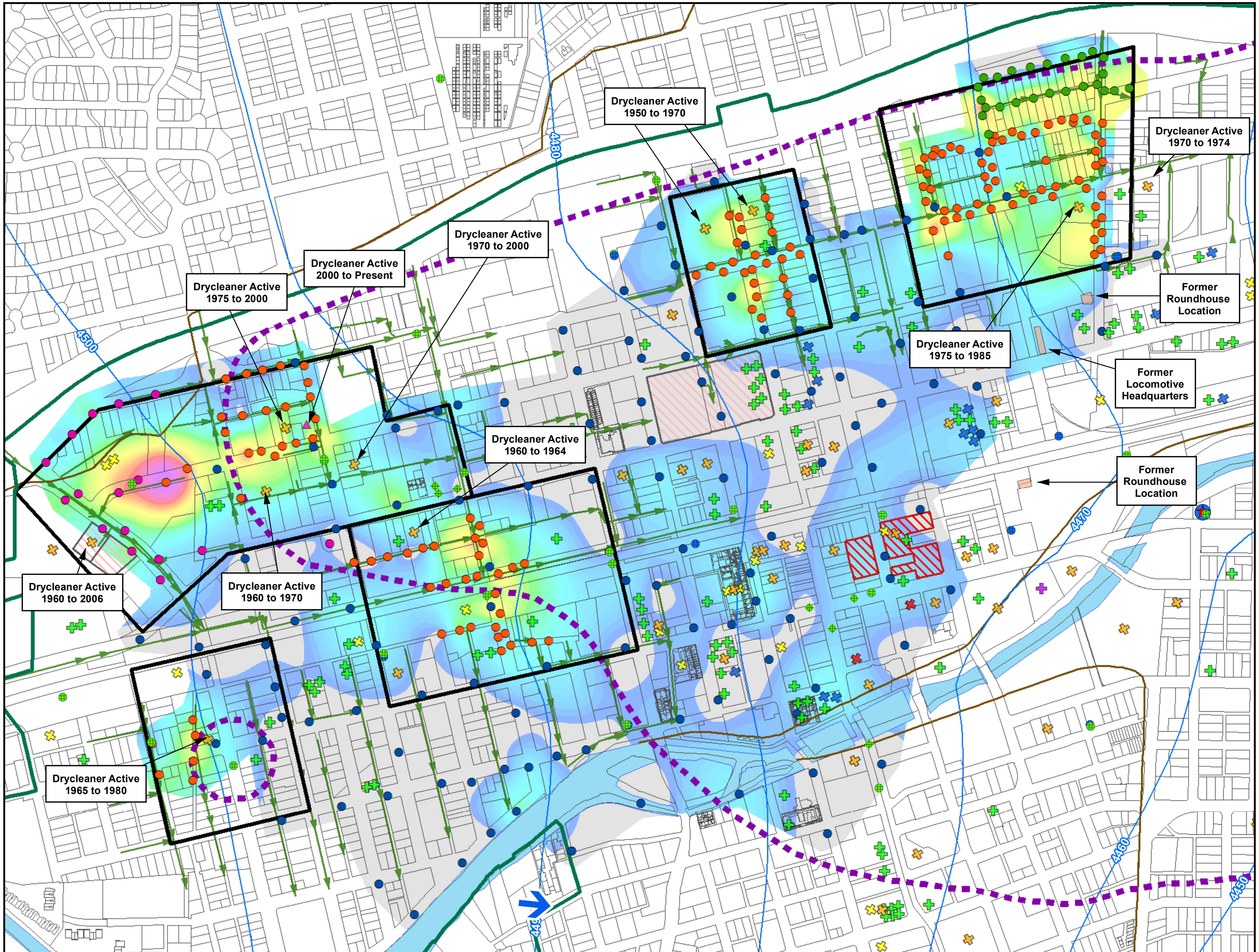
November 2017

Central Truckee Meadows Remediation District Program

1 inch = 550 feet

0 250 500 Feet

Figure 4 - West 4th Street Potential Source Area (PSA)



PCE Plume Outline

Groundwater Flow Direction (Shallow Zone)

Water Level Elevation Contour (Shallow Zone)

Color Contoured PCE Passive Soil Gas (PSG) Data

Phase 1 PSG Survey Locations (April/May 2009)

Phase 2 PSG Survey Locations (October/November 2009)

Phase 3 PSG Survey Locations (October 2009)

Phase 4 PSG Survey Locations (July 2012)

Sanitary Sewer with Flow Direction

Stream

Ditch / Slough

PCE High Mass Areas (HMA, Defined by PSG Data)

CTMRD Contaminant Boundary

PCE Detected in Sewer (> 100 µg/L) Downstream from PCE-using Business

Current PCE Corrective Action Site

Former PCE Corrective Action Site

Potential PCE Using Businesses

- Dry Cleaner (Current)
- Dry Cleaner (Historical)
- Auto Repair
- Auto Paint
- Fleet Repair
- Chemical Manufacturer
- Paint Shop

Well Type Symbology

- MONITORING - WCCSD
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- PRODUCTION - OTHER
- DOMESTIC
- DEEP ZONE WELL
- SHALLOW ZONE WELL
- ABANDONED WELL
- INDUCTION WELL

Central Truckee Meadows Remediation District Program

Seal of Washoe County State of Nevada

November 2017

1 inch = 550 feet

N

0 125 250 Feet

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