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Remedial Design Work Plan Attachment N

Monitoring Well Network Evaluation and Groundwater Monitoring Program

Solvents Recovery Service of New England, Inc.
(SRSNE) Superfund Site
Southington, Connecticut

November 2010

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Southington, Connecticut

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Executive Summary

This *Monitoring Well Network Evaluation and Groundwater Monitoring Program* has been prepared to address Section V.C.1.m of the Statement of Work (SOW) for the Remedial Design/Remedial Action (RD/RA) activities at the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut. It describes the existing and proposed network of wells, piezometers, and extraction wells (collectively referred to as "wells") that will be used to monitor groundwater and quality and hydraulics during the RD/RA activities. It also presents various aspects of the monitoring program and summarizes the scope and timing for the monitoring events.

The monitoring network of 160 wells includes 134 existing wells and 26 additional wells that are proposed for installation. In addition, 40 other existing wells are proposed for abandonment. The network includes124 wells that will be used for groundwater sampling and water level monitoring, and 36 additional wells that will be used for water level monitoring only. The data to be obtained from the network will be used to assist in characterizing:

- groundwater flow directions
- the capture zone of the hydraulic containment and treatment system
- SRSNE-related plume extent and concentrations trends over time
- monitored natural attenuation (MNA) of the plume
- background concentrations of metals and MNA parameters
- temperature changes and VOC concentration changes immediately downgradient of the in-situ thermal remediation zone

These data will be collected during comprehensive groundwater monitoring events every 5 years, and additional monitoring events at subsets of wells with sampling frequencies ranging from every three months to every two years.

1. Introduction

1.1 Purpose and Scope

This document has been prepared on behalf of the SRSNE Site Group, an unincorporated association of the Settling Defendants to a Consent Decree (CD) and Statement of Work (SOW) for the Remedial Design/Remedial Action (RD/RA) at the Solvents Recovery Service of New England, Inc. (SRSNE) Superfund Site in Southington, Connecticut (Site). The CD was lodged on October 30, 2008 with the United States District Court for the District of Connecticut in connection with Civil Actions No. 3:08cv1509 (SRU) and No. 3:08cv1504 (WWE). The CD was entered by the Court on March 26, 2009.

This document describes proposed modifications to the groundwater monitoring network for the Site. These modifications will result in a network of monitoring wells suitable for evaluating groundwater quality within the source areas, downgradient plume, and upgradient "background" area during the implementation of the RD/RA for the Site. Well network modifications described herein are based in part on the results of discussions between the SRSNE Site Group, the United States Environmental Protection Agency (USEPA), and the Connecticut Department of Environmental Protection (CTDEP) on February 11 and 12 and March 30 and 31, 2009 in Windsor, Connecticut.

To help meet the Performance Standards specified in SOW Sections IV.B.5.a and V.C.1.m, ARCADIS, on behalf of the SRSNE Site Group, performed a well network evaluation and identified appropriate modifications to the well network based on preliminary input provided by USEPA and CTDEP during the meetings on February 11 and 12 and March 30 and 31, 2009. The results of the well network evaluation are described in this document. The resulting network of monitoring wells will be used to monitor changes in concentrations of constituents of concern (COCs) within the dissolved-phase plumes, plume size and shape, and the effectiveness of natural attenuation processes in three dimensions throughout the plume within the overburden and bedrock aquifers. The network of monitoring wells will also be used to demonstrate in three dimensions that groundwater that exceeds federal drinking water standards and other risk-based levels is being captured. The well network will be subject to periodic evaluation and may change over time. To meet the performance standard for the monitoring well network (SOW Section

IV.B.5.a.), new monitoring wells will be installed to fill data gaps in the following areas: the eastern edge of the plume (east of the Quinnipiac River); the area between the former Boston and Maine Railroad tracks and the Non-Time-Critical Removal Action No. 1 (NTCRA 1) sheet pile wall; and the power-line right-of-way within the Town of Southington Well Field (Figure N-1).

To identify appropriate changes to the monitoring network, ARCADIS evaluated the existing network of groundwater monitoring wells to:

- identify wells for possible abandonment
- identify existing wells for inclusion in the groundwater monitoring network
- identify material gaps in the existing groundwater monitoring network
- propose locations for new monitoring wells needed to meet the performance standard for the groundwater monitoring program specified in Section IV.B.5 of the SOW

As used in this document, the term “wells” includes:

- *monitoring wells* that have provided the majority of the water-quality data not obtained from pumping wells
- *pumping wells* that are used to maintain hydraulic control of the plume in two general areas
- *piezometers* that are used for hydraulic head monitoring, some of which were sampled during the Remedial Investigation (RI)

1.2 Format of Document

This document is organized in the following sections:

- **Section 1 – Introduction:** Describes the purpose, scope, and organization of this document
- **Section 2 – Background:** Summarizes pertinent background information, including the hydrogeologic setting, identification of

monitored groundwater zones, well construction information, and information regarding the plume configuration and recent trends

- **Section 3 – Groundwater Monitoring Well Network Modifications:** Summarizes proposed well network modifications, including well abandonment, new well installations, and the planned well inspection and maintenance activities

- **Section 4 – Purposes for Monitoring Well Network:** Identifies the multiple purposes for which the modified well network is intended to serve

- **Section 5 – Groundwater Monitoring Events and Scope:** Summarizes the scope and timeframe for planned groundwater sampling events

- **Section 6 – References:** Lists documents cited herein

Tables N-1 and N-2 present a summary of the proposed groundwater sampling events, well construction information and proposed modifications of the well network. Figure N-1 shows the study area. Figures N-2 through N-6 present the proposed monitoring network for each of the five monitored intervals, which are defined below in Section 2.2. Figure N-7 shows well cluster locations, each containing three or more wells.

2. Background

2.1 Hydrogeologic Setting

The overburden generally consists of outwash over till. The bedrock consists of red to reddish-brown to pink sedimentary rocks, including sandstone and siltstone with occasional conglomerate. Groundwater in the vicinity of the Site flows through the overburden units and the bedrock, and converges toward the Quinnipiac River from the east and the west. The horizontal component of the hydraulic gradient at the former Operations Area is generally southeastward toward the river. Additional details regarding the hydrogeologic setting are provided in the *Remedial Design Work Plan* (RDWP).

2.2 Monitored Zones

Five groundwater zones are currently monitored at the SRSNE Site:

- *Shallow, middle, and deep overburden*, which represent the upper, middle, and lower thirds of the saturated overburden deposits, respectively

- *Shallow and deep bedrock*, which represent approximately the upper 30 feet of bedrock and the portion of bedrock that is more than 30 feet below the top of rock, respectively

These five zones were established based on geology (overburden versus bedrock) and on the desire for vertical resolution to the presentation of data. The thickness of the saturated overburden ranges from approximately zero to 100 feet in the RI Study Area. Consequently, the thickness and depth of the three overburden zones are variable. Within the area where Site-related COCs have been detected above Federal Maximum Contaminant Levels (MCLs) or CTDEP Class GA Groundwater Protection Criteria (GWPC) during the most recent sampling (April 2005), the saturated overburden thickness ranges from approximately 10 to 70 feet. Thus, the thickest monitored overburden zones within the area where Site-related COCs were detected above these drinking water standards is 70 feet ÷ 3, or approximately 23 feet thick.

2.3 Well Construction

Table N-2 summarizes well construction information for the existing and proposed monitoring well network. All of the wells proposed for future sampling are constructed with polyvinyl chloride (PVC) screens and risers, sand packs, and bentonite seals. The average length of well screens for overburden wells proposed for sampling is approximately 10.3 feet. In the less permeable bedrock, the average length of screens for wells proposed for sampling is approximately 16.7 feet. The *Field Sampling Plan* (FSP; Attachment B to the *Remedial Design Project Operations Plan* [RD POP]) presents details and SOPs regarding drilling, installation, development and hydraulic testing of proposed monitoring wells.

3. Groundwater Monitoring Well Network Modifications

Proposed modifications to the groundwater monitoring network are detailed on Table N-2 and in Figures N-2 through N-6, and primarily include well abandonment and well installation. The existing wells will also be evaluated as part of a well maintenance program to identify the need for appropriate repairs or well replacements, if any.

3.1 Well Abandonment

Wells proposed for abandonment are listed in Table N-2. Wells were selected for abandonment based primarily on the results of discussions between the SRSNE Site Group, USEPA, and CTDEP on February 11 and 12, 2009, in Windsor, Connecticut. Additional wells may be identified for abandonment based on the findings of the well inspection and maintenance program (Section 3.3).

The rationale for abandonment of each targeted well is indicated on Table N-2, and was based on the following considerations:

- Location within the area where the overburden will be treated by In-Situ Thermal Remediation (ISTR) – the high temperatures would likely destroy any existing wells within this area [as described in the *Pre-ISTR Preparation Plan* (PIPP; Attachment M to the RDWP)]

- Existing monitoring wells inside (west of) the NTCRA 1 sheet pile wall in the NTCRA 1 Containment Area, except for the existing monitoring wells proposed for use as “N” wells (as described in the PIPP)

- Wells with screens across the overburden/bedrock interface

- Wells on an upgradient property (TW-9 and TW-10), if access permission can be obtained

- A well with a known obstruction (P-15)

As the agencies requested during the February 11 and 12, 2009 meeting, other monitoring wells that are not currently proposed for sampling or water level measurements during the RD/RA will be retained as "dormant" wells, which may be used in the future, as appropriate. Wells with this designation are indicated in Table 2.

Even after the proposed abandonment of wells and placement of others on the "dormant" list, the proposed "active" groundwater monitoring network will include 124 wells for water-quality and water-level monitoring, and 36 additional wells for water level monitoring only. In the event that wells targeted for monitoring are found during the well integrity survey to be unsuitable and unrepairable, it is anticipated that such wells would be abandoned and replaced. At the conclusion of the well integrity survey, a technical memo will be prepared and submitted to the USEPA and CTDEP to summarize the observed conditions and recommended actions (including abandonment, where appropriate) for each well.

Wells will be abandoned using the procedures detailed in the FSP.

3.2 Wells Proposed for Installation

3.2.1 Proposed Well Locations and Construction

Wells are proposed for installation at the locations shown on Figures N-2 through N-6. Table N-2 indicates, for each proposed well, the estimated depth, screen length, and monitoring group. Wells are proposed for installation near the eastern edge of the plume (east of the Quinnipiac River), in the area between the former Boston and Maine Railroad tracks and the NTCRA 1 sheet pile wall, and in the power-line right-of-way within the Town of Southington Well Field, as required by SOW Section IV.B.5.a. Additional wells are proposed to fill general data gaps and produce well clusters containing multiple wells in different monitored zones, in transects across the plumes, and along the plume axes in each monitored zone.

As indicated above, if during the well integrity survey field staff find existing wells targeted for monitoring to be unsuitable for continued use, the existing wells would be abandoned and replaced. To the extent possible, replacement wells would be installed in the immediate vicinity of the abandoned wells and with similar diameter, depth, and screened interval as the originals.

Well installation procedures are described in detail in the FSP. The wells will be constructed of PVC screens and risers, with the possible exception of the proposed “N” wells in the NTCRA 1 Containment Area. TerraTherm, the thermal remediation contractor, will perform calculations as part of the Final Design Report for in-situ thermal remediation to predict the increase in groundwater temperatures that may occur downgradient of the thermal treatment area. Based on the results of those calculations, the proposed “N” wells may be installed using stainless steel well materials.

3.2.2 Property Access Process

The SRSNE Site Group already has access to the Operations Area and former Cianci Property. The group was granted access to the Town Well Field Property area during the RI, FS, and NTCRA 2 phases of the project, and soon expects to have access to the area for RD/RA purposes. For other properties where well installations are proposed, including properties west of Queen Street, *de maximis, inc*., will attempt to obtain property access consistent with the approach described in the *Site Management Plan* (included as Attachment A to the RD POP).

3.3 Well Inspection and Maintenance Program

The FSP describes a well inspection and maintenance program planned as part of the RD/RA activities. The program contains provisions for inspection, continued maintenance, repair, removal of accumulated silt, and prompt and proper abandonment of wells, where appropriate. The maintenance program will be performed prior to or concurrent with the installation of proposed wells and abandonment of existing wells, as discussed above, and as part of this effort, field staff may identify additional wells that need to be abandoned and replaced. The FSP describes the well maintenance program in detail, and includes a Standard Operating Procedure for Monitoring Well Integrity Survey with a Well Integrity Assessment Form.

4. Purposes for Monitoring Well Network

4.1 General Plume Characterization

The proposed monitoring network is summarized in Tables N-1 and N-2, and on Figures N-2 through N-6. The network consists of 124 monitoring wells to be used for sampling and water-level measurements, and 36 additional wells to be used for water-level measurements only. The data obtained from this extensive monitoring network will be used to characterize the SRSNE-related COC plume in terms of:

- plume extent in all five hydrostratigraphic zones (in all three dimensions)
- temporal and spatial variations in plume chemistry and geometry
- progress in meeting the long-term remedial goal of groundwater restoration
- effectiveness of institutional controls
- capture of all groundwater that exceeds federal drinking water standards and other risk-based levels

These monitoring purposes are listed in SOW Section VII.A.1. The general timing of sampling events and lists of analytical parameters are presented in Section 5 and summarized in Table N-1.

Groundwater sampling results obtained from the proposed monitoring wells will be used to delineate the Site-related plume in all five hydrostratigraphic zones. Consistent with the plume delineation process used during the completion of the RI (BBL 1998), concentration gradient reversals and groundwater flow directions will also be considered in identifying the perimeter of the SRSNE-related COC plume. Groundwater modeling with particle tracking may be used to depict the groundwater flow path upgradient of one or more monitoring wells to assess the general direction of the source for COCs, if any, detected at the well(s). As stated in detail in the RI Report (BBL 1998), the maximum depth of the plume cannot be determined safely due to the risk of mobilizing non-aqueous phase liquid (NAPL) during drilling and contaminating the deeper bedrock that does not currently contain any VOCs. The depth of the plume will be inferred indirectly, based on the three-dimensional distribution of dissolved COCs and groundwater flow directions. Based on the depth of the VOC plume

in bedrock and hydraulic head data plotted in a cross section parallel to the Quinnipiac River, it was concluded that highly impacted groundwater may extend to a depth on the order of 200 feet below ground surface (bgs) in the area near the Quinnipiac River. Given the upward flow of bedrock groundwater in the area near the river, it is likely that the base of the SRSNE-related COC plume is at a comparable depth, approximately 200 feet bgs. A similar evaluation will be performed to estimate the vertical extent of the COC plume during the RD/RA. In addition, cross sections depicting geology, head measurements, and flow directions will be constructed for each *comprehensive* groundwater sampling event.

Periodic sampling of wells within the plume will provide additional data to supplement historical data – the composite data set will demonstrate the temporal and spatial variations in plume chemistry and geometry, and progress in meeting long-term groundwater restoration goals. Plume delineation results will also provide a basis to confirm that the institutional controls relating to groundwater are effective.

4.2 Capture Zone Evaluation

4.2.1 Performance Standards for Hydraulic Containment and Treatment System

As stated in SOW Section IV.B.2, the performance standards for Hydraulic Containment and Treatment (HCTS) indicate that “Groundwater in the overburden and bedrock aquifers that contains Site-related contaminants shall continue to be captured and treated on site using the NTCRA 1 and 2 Groundwater Extraction Systems, unless and until it is modified in accordance with the groundwater containment and treatment evaluation and optimization study (GCTEOS) The performance standards for the HCTS, set forth in Attachment B, shall be met at all times following lodging of the Consent Decree, unless and until they are modified...”. The groundwater extraction components of the HCTS currently consist of the NTCRA 1 and NTCRA 2 Groundwater Extraction Systems.

The HCTS performance standards use comparisons of water levels at key pairs of wells and piezometers to verify that groundwater is flowing in the direction of the extraction wells and the hydraulic gradient has been reversed in the area formerly downgradient of the extraction wells. Monitoring and reporting of the HCTS performance standards will continue as part of routine

operation and monitoring of the groundwater containment and treatment system. If HCTS performance standards are not being met, appropriate response actions will be proposed in the next Annual State of Compliance Report.

4.2.2 Groundwater Containment and Treatment System Evaluation and Optimization Study

A GCTEOS will be performed upon completion of the ISTR and excavation/capping components of the remedy, as described in SOW Section V.C.4. The GCTEOS will be conducted to demonstrate that the performance standards for the HCTS and the Severed Plume are being met. As defined in the SOW, the Severed Plume is "that portion of the groundwater plume in the overburden and bedrock aquifers underlying the Site that is not captured by the HCTS." Therefore, the GCTEOS will include a capture zone analysis. A work plan for the GCTEOS, which describes the capture zone analysis process, is provided in Attachment O to the RDWP.

If the performance standards are not met, modifications and/or enhancements to the HCTS will be proposed, as necessary to achieve compliance.

4.3 Monitoring of Groundwater Quality between Railroad Tracks and NTCRA 1 Sheet Pile Wall

As described in SOW Sections IV.B.5.d and e, groundwater must be monitored at a select subset of monitoring wells in the overburden and bedrock in the area between the former Boston and Maine railroad tracks and the NTCRA 1 sheet pile wall, with different sampling frequency during various stages of the RD/RA process (e.g., before thermal treatment, during thermal treatment, after thermal treatment until equilibrium is reestablished, and after equilibrium is reestablished). The proposed groundwater monitoring network includes eight overburden and two bedrock wells to meet this objective. These wells are designated as "N" wells shown on Figures N-2 through N-6, and listed in Table N-2. The sampling frequency and analytical parameters are summarized in Table N-1 and discussed in more detail below.

4.4 Monitored Natural Attenuation Parameter Assessment

The evaluation of monitored natural attenuation (MNA) will require collection of groundwater samples for analysis of specific "MNA parameters" to assist in

evaluating geochemical conditions conducive to biodegradation. MNA parameters, which are listed in the *MNA Plan* (Appendix L to the RDWP), will be monitored at the 36 monitoring wells designated as "N" or "R" wells shown on Figures N-2 through N-6, and listed in Table N-2. In addition, five background monitoring wells ("M" wells) will be sampled for MNA parameters to characterize the geochemistry of groundwater before it enters the SRSNE-related COC plume. The sampling frequencies for these parameters at these wells are summarized in Table N-1 and discussed in more detail below.

4.5 Vapor Intrusion Assessment

The remedial design phase will include an assessment of vapor intrusion potential associated with VOCs in shallow overburden groundwater. As described in SOW Section V.C.1.k, "the Settling Defendants and CT DEP agree that the Settling Defendants shall delineate the extent of the shallow groundwater plume in the overburden aquifer that exceeds applicable CT RSR residential or industrial/commercial volatilization criteria." The data necessary to perform this evaluation will be obtained from the shallow overburden monitoring wells shown on Figure N-2 during the first comprehensive monitoring event.

Of particular interest will be the shallow overburden monitoring wells, including two new wells proposed for installation near occupied commercial buildings between the Quinnipiac River and Queen Street. Additional shallow overburden monitoring wells are proposed in this area to further refine the extent of the VOC plume in the shallow overburden in that area. It is possible that other VOC source areas unrelated to the SRSNE Site may exist in the commercial area between the river and Queen Street (e.g., automotive maintenance/repair facilities, etc.). The groundwater analytical results will be reviewed in terms of groundwater flow directions to assess whether VOC detections, if any, are unrelated to the SRSNE plume. Groundwater modeling using particle-tracking may be performed to assess whether the groundwater at a specific shallow overburden well may have migrated from a portion of the known SRSNE-related plume, or another source unrelated to the SRSNE Site.

4.6 Background Groundwater (Metals)

As discussed in SOW Section VIII.F, "no sooner than 365 days prior to submittal of the Demonstration of Compliance Report (Section VIII.G of the SOW), the SRSNE Site Group shall submit a Determination of Background for

Metals in Groundwater Report. In this report, the SRSNE Site Group shall propose Interim Cleanup Levels for the metals specified in Table L-1 of the ROD (included in Appendix A of the SOW and Appendix 1 of the RDWP), ARARs, and newly-promulgated ARARs and modified ARARs which call into question the protectiveness of the remedy. The proposed Interim Cleanup Levels for metals shall be equal to the background concentrations for groundwater of each substance, and shall be subject to USEPA approval or modification, after reasonable opportunity for review and comment by CT DEP. Upon approval, these concentrations must be met in accordance with the requirements in Section IV.A.1 of this SOW."

Background groundwater has already been sampled for analysis during several historical groundwater sampling events dating back to the early 1990s. The historical data will be supplemented by additional groundwater sampling for target analyte list (TAL) metals at eight background monitoring wells designated as "M" or "B" wells, including four overburden and four bedrock wells, listed in Table N-2 and shown on Figures N-2 through N-6. The sampling frequencies are summarized in Table N-1 and discussed in more detail below.

4.7 Wells for Measuring Water Levels Only

Thirty-six wells are proposed to be used for water-level measurements only. These include the NTCRA 1 and NTCRA 2 extraction wells, selected wells that were installed by the United States Geological Survey (USGS) in the 1970s, other wells that are in useful locations for providing water-level data. Wells subject to water-level monitoring only are shown with a "W" on Figures N-2 through N-6.

4.8 Contingency Measures if Proposed Wells Do Not Achieve Objectives

In the event that groundwater monitoring data collected from the proposed well network as part of the program described in this section indicate that changes are appropriate in terms of groundwater monitoring locations or frequency, the SRSNE Site Group will provide recommendations regarding additional monitoring modifications to the USEPA and CTDEP. As described in SOW Section VIII.B, such recommendations will be provided, with justification, in Annual State of Compliance Reports. Such changes could include installation of additional wells, well abandonment, or changes in sampling frequency and/or analytical parameters.

5. Groundwater Monitoring Events and Scope

This section describes the types of groundwater monitoring events, in terms of wells, frequency, analytical parameters, and sampling methods. Table N-1 provides a summary of the sampling events to be completed using each monitoring well group. The anticipated schedule for the various groundwater sampling events is presented in the RD POP.

5.1 Initial Comprehensive Sampling Event

As described in SOW Section IV.B.5.b, an initial comprehensive sampling event will be performed across the entire plume to support the first Five-Year Review. All 160 wells and piezometers listed in Table N-2 and shown on Figures N-2 through N-6 with a “B”, “C”, “N”, “M”, “R” or “W” designation will be used for water level measurements to assist in capture zone analysis. All wells will also be sampled, with the exception of the 36 “W” wells, which will only be used for water level measurements. Depending on the timing of requisite approvals, this event will be conducted in 2009 or 2010, in time for inclusion of the data in the first Five Year Review Report, which is due in September 2010 (i.e., five years after the ROD).

Groundwater samples will be obtained from 116 wells situated across the entire plume – designated “C”, “R”, and “N” wells – for analysis of VOCs, alcohols, 1,4-dioxane, TAL metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). In addition, 41 wells designated “N”, “R”, and “M” will be sampled for MNA Parameters. The eight background wells designated “M” and “B” will be sampled for TAL metals. These groups of wells are summarized in Tables N-1 and N-2, and shown on Figures N-2 through N-6.

Shallow overburden wells MW-501C, MW-903S, and MW-904S will be re-sampled approximately six months after the first comprehensive sampling event to provide additional data to assess the potential for vapor intrusion at commercial buildings between the Quinnipiac River and Queen Street.

These data will be evaluated and reported as described in the *Vapor Intrusion Study Work Plan* (Appendix K to the RDWP).

5.2 Subsequent Comprehensive Sampling Event

As described in SOW Section IV.B .5.c., subsequent comprehensive sampling events will be performed across the entire plume to support subsequent five-year reviews. All of the wells and piezometers listed in Table N-2 and shown on Figures N-2 through N-6 will be used for water level measurements to assist in capture zone analysis. All of these locations will also be sampled, with the exception of the "W" wells, which will only be used for water level measurements.

Groundwater samples will be obtained from 116 wells situated across the entire plume – designated "C", "R", and "N" wells – for analysis of VOCs, 1,4-dioxane, and TAL metals. In addition, 41 wells designated "N", "R", and "M" will be sampled for MNA Parameters. The eight background wells designated "M" and "B" will be sampled for TAL metals. If PCBs and/or PAHs are detected in groundwater during the initial comprehensive sampling event, they may also be sampled for at a subset of wells during subsequent comprehensive sampling events.

These subsequent sampling events will be conducted in the year prior to the five-year review, with the exception of the first five-year review. Thus, these sampling events will be performed every five years starting in 2014.

Reductions in monitoring, and associated justifications, may be presented in the Annual State of Compliance Reports.

5.3 Sampling between Railroad Tracks and NTCRA 1 Sheet Pile Wall

As described SOW Sections IV.B.5.d and e, the SOW requires groundwater monitoring at a select subset of monitoring wells in the overburden and bedrock in the area between the former Boston and Maine railroad tracks and the NTCRA 1 sheet pile wall, with different sampling frequency during various stages of the RD/RA process. The 10 "N" wells shown on Figures N-2 through N-5 are proposed to meet this requirement. The sampling events for the eight overburden "N" wells (Figures N-2 through N-4) and two bedrock "N" wells (Figure N-5) are summarized below and in Table N-1.

5.3.1 Overburden

Overburden "N" wells in the area between the railroad tracks and the NTCRA 1 sheet pile wall will be sampled with the following frequency:

- before the start of in-situ thermal treatment – biennial sampling (every other year) for VOCs and MNA parameters
- during in-situ thermal treatment – annual sampling for VOCs and MNA parameters
- after in-situ thermal treatment is complete until equilibrium is restored – sampling three times per year for VOCs and MNA parameters
- after equilibrium is restored – annual sampling for VOCs and biennial sampling for MNA parameters

5.3.2 Bedrock

Bedrock "N" wells in the area between the railroad tracks and the NTCRA 1 sheet pile wall will be sampled with the following frequency:

- before the start of in-situ thermal treatment – annual sampling for VOCs and MNA parameters
- during in-situ thermal treatment – annual sampling for VOCs and MNA parameters
- after in-situ thermal treatment is complete until equilibrium is restored – sampling three times per year for VOCs and MNA parameters
- after equilibrium is restored – annual sampling for VOCs and biennial sampling for MNA parameters

5.3.3 Equilibrium Following Thermal Remedy

Following the completion of the thermal soil remedy, it is expected that a period of time will elapse before the groundwater returns to equilibrium conditions. It is expected that the definition of "equilibrium" will be based on temperature measurements that will be obtained at the "N" wells between the former Boston

and Maine railroad tracks and the NTCRA 1 sheet pile wall. The Final Design Report for in-situ thermal remediation will provide further details regarding the collection and interpretation of temperature data to determine when equilibrium is reached, triggering a reduction in groundwater sampling frequency at each of the "N" wells. Based on observations that TerraTherm has made at other thermal remediation sites and their preliminary calculations for the SRSNE Site, it is expected that the groundwater temperatures will return approximately to pre-thermal temperatures within a period of two to three years.

5.4 Additional Sampling Outside of NTCRA 1 Sheet Pile Wall

As described in SOW Section IV.B.5.f, annual monitoring of VOCs and biennial monitoring of MNA parameters is also required at a select subset of monitoring wells in the overburden and bedrock in the area outside the NTCRA 1 sheet pile wall. This requirement of routine plume sampling will be met by sampling from the 26 monitoring wells designated "R", which are listed in Tables N-1 and N-2, and shown on Figures N-2 through N-6.

Similar to the "R" wells, annual monitoring of TAL metals and biennial monitoring of MNA parameters will be performed at the background "M" wells. Finally, annual monitoring of TAL metals will be performed at the background "B" wells. These sampling events are summarized on Tables N-1 and N-2, and the well locations are shown on Figures N-2 through N-6.

5.5 Long-Term Monitoring

Once in-situ thermal treatment is complete and equilibrium is restored, as determined by USEPA, the SRSNE Site Group may propose a reduction in frequency of long-term annual monitoring. Any such proposal will be supported by a demonstration that such a reduction is protective and meets the Performance Standards established in Section SOW IV.B.5 related to Environmental Monitoring. The proposal(s) for reduced monitoring shall be submitted as part of the Annual State of Compliance Report(s), required in Section VIII.B of the SOW. In addition to reduced frequency, a proposal may be submitted for additional well abandonments if it is determined that a well is no longer required for plume characterization. For example, after the submittal and approval of the "Determination of Background for Metals in Groundwater" report, the background wells will no longer be needed for groundwater characterization, and may be proposed for abandonment or water-level monitoring only.

5.6 No-Purge versus Low-Flow Field Demonstration

As described in the FSP, it is proposed that the majority of the groundwater sampling, with the exception of the first comprehensive event, be conducted using no-purge groundwater samplers known as HydraSleeve™. To support the use of HydraSleeve™ for sampling groundwater during the RD/RA, a Site-specific field demonstration will be performed at a representative subset of monitoring wells in the overburden and bedrock, spanning a wide range of COC concentrations, hydraulic conductivities, and locations with respect to the SRSNE-related COC plume.

The field demonstration will be performed during the first comprehensive groundwater sampling event, and the results of HydraSleeve™ will be compared to those obtained from low-flow sampling methods to verify that the results are similar using either method. Further details are provided in the FSP.

After review of the results of the field demonstration, USEPA will determine which, if any, sampling events may be conducted using HydraSleeve™ in place of USEPA Region 1's approved low-flow sampling procedures.

6. References

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Tables

Table N-1.
Groundwater Monitoring Network and Sampling Events
SRSNE Superfund Site, Southington, CT

Well Group	# Wells	Sampling Period	Sampling Frequency	Analytical Parameters
"C" wells	80	first comprehensive event	1 event	VOCs, alcohols, 1,4-dioxane, TAL metals, PAHs, PCBs
"R" wells	26			VOCs, alcohols, 1,4-dioxane, TAL metals, PAHs, PCBs, MNA parameters
"N" wells	10			VOCs, alcohols, 1,4-dioxane, TAL metals, PAHs, PCBs, MNA parameters
"M" wells	5			TAL metals, MNA parameters (background)
"B" wells	3			TAL metals (background)
"C" wells	80	subsequent comprehensive events	every 5 years	VOCs, 1,4-dioxane, TAL metals
"R" wells	26			VOCs, 1,4-dioxane, TAL metals, MNA parameters
"N" wells	10			VOCs, 1,4-dioxane, TAL metals, MNA parameters
"M" wells	5			TAL metals, MNA parameters
"B" wells	3			TAL metals
"R" wells	26	after first comprehensive event	annual	VOCs
			biennial	MNA parameters
"M" wells	5	after first comprehensive event	annual	TAL metals (background)
			biennial	MNA parameters (background)
"B" wells	3	after first comprehensive event	annual	TAL metals (background)
"N" wells - overburden	8	before thermal treatment	biennial	VOCs, MNA parameters
		during thermal treatment	annual	VOCs, MNA parameters
		after thermal, before equilibrium	3x / year	VOCs, MNA parameters
		after equilibrium	annual	VOCs
			biennial	MNA parameters
"N" wells - bedrock	2	before thermal treatment	annual	VOCs, MNA parameters
		during thermal treatment	annual	VOCs, MNA parameters
		after thermal, before equilibrium	3x / year	VOCs, MNA parameters
		after equilibrium	annual	VOCs
			biennial	MNA parameters
"W" wells	36	all comprehensive events	every 5 years	Water levels only - during all comprehensive events

Notes:
1) biennial = once every two years.
VOCs = Volatile Organic Compounds.
TAL = Target Analyte List.
PAHs = Polycyclic Aromatic Hydrocarbons.
PCBs = Polychlorinated Biphenyls.
MNA = Monitored Natural Attenuation.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
CPZ-1	565212	286107	4.6	19.6	O					1					12.1
CPZ-2	565216	286045	9.6	19.6	O								1		14.6
CPZ-3	565290	286163	9.2	24.2	O					1					16.7
CPZ-4	565322	286092	8.7	23.7	O								1		16.2
CPZ-5	565376	286312	9.1	24.1	O					1					16.6
CPZ-6	565480	286325	10.2	25.2	O					1					17.7
CPZ-7	565343	286467	3.9	23.9	O					1					13.9
CPZ-8	565397	286529	10.5	20.5	O					1					15.5
CPZ-9	565229	286575	9.7	19.7	O									1	14.7
CPZ-10	565237	286643	9.1	19.1	O					1					14.1
CPZ-1R	565209	286103	41.1	61.1	R					1					51.1
CPZ-2R	565217	286039	40.1	60.1	R					1					50.1
CPZ-3R	565286	286158	43.2	63.2	R					1					53.2
CPZ-4R	565322	286085	45.9	65.9	R					1					55.9
CPZ-5R	565374	286319	42.0	62.0	R					1					52.0
CPZ-6R	565480	286318	50.1	70.1	R					1					60.1
CPZ-7R	565338	286472	41.0	61.0	R					1					51.0
CPZ-8R	565395	286533	41.7	61.7	R				1						51.7
CPZ-9R	565244	286575	34.2	54.2	R									1	44.2
CPZ-10R	565233	286642	40.3	60.3	R					1					50.3
CPZ-2A	565219	286090	7.3	22.3	O					1					14.8
CPZ-4A	565300	286147	8.3	23.3	O				1						15.8
CPZ-6A	565396	286321	9.1	24.1	O					1					16.6
CW-1-78	565213	285075	35.0	40.0	O						1				37.5
CW-2-78	565073	285036	22.0	27.0	O								1		24.5
CW-3-75	565678	285115	27.5	32.5	O								1		30.0
CW-3-78	565162	284652	15.0	20.0	O								1		17.5
CW-4-75	565312	285355	30.0	35.0	O						1				32.5
CW-4-78	565155	284650	55.0	60.0	O								1		57.5
CW-5-75	565286	285030	32.0	37.0	O								1		34.5
CW-5-78	565251	284543	67.0	72.0	O								1		69.5
CW-6-75	565222	284832	40.0	45.0	O								1		42.5
CW-6-78	565396	284625	78.0	83.0	O								1		80.5
CW-B-77	565310	285711	18.0	23.0	O						1				20.5
DN-3	565128	286040	8.8	21.8	O					1					15.3
DP-1	565620	286146	0.6	3.1	O								1		1.8
DP-2	565597	286323	1.5	6.5	O								1		4.0
DP-3	565578	286481	1.2	6.2	O								1		3.7

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
DP-4	565524	286655	1.2	6.2	O								1		3.7
DP-5	565602	287100	1.2	6.2	O								1		3.7
DP-6	565599	286886	0.9	5.9	O								1		3.4
DP-7	565520	286887	2.1	7.1	O								1		4.6
DP-8	565523	287085	7.1	12.1	O								1		9.6
MW-01	565281	285950	23.5	48.5	OR									1	36.0
MW-02	565307	285338	39.0	69.0	OR									1	54.0
MW-03	565509	285065	52.5	82.5	O				1						67.5
MW-04	565622	285470	46.0	76.0	OR									1	61.0
MW-05	565651	286030	66.5	76.5	R					1					71.5
MW-06	565660	286017	24.0	64.0	O								1		44.0
MW-07	565646	286028	14.5	44.5	O								1		29.5
MW-08	565654	286015	5.0	25.0	O								1		15.0
MW-121A	565539	285834	74.0	95.0	R					1					84.5
MW-121B	565532	285817	42.0	52.0	O				1						47.0
MW-121C	565535	285826	58.7	68.7	R				1						63.7
MW-121M	565540	285810	21.0	31.0	O				1			1			26.0
MW-123A	565280	286128	55.0	85.0	R								1		70.0
MW-123C	565274	286126	10.0	15.0	O								1		12.5
MW-124C	565238	285852	35.9	45.9	R				1						40.9
MW-125A	565403	286393	60.0	65.0	R								1		62.5
MW-125C	565402	286382	40.5	50.5	R					1					45.5
MW-126B	565124	287008	7.5	12.5	O		1								10.0
MW-126C	565123	287011	24.0	34.0	R			1							29.0
MW-127B	565403	285087	37.0	47.0	O					1					42.0
MW-127C	565404	285081	91.5	101.5	R				1						96.5
MW-128	565211	285319	55.0	65.0	R					1					60.0
MW-129	563866	286975	13.9	23.9	R								1		18.9
MW-201A	565732	287690	54.0	64.0	R								1		59.0
MW-201B	565737	287694	10.0	20.0	O								1		15.0
MW-202A	566031	287225	119.0	129.0	R						1				124.0
MW-202B	566037	287225	82.5	92.5	O						1				87.5
MW-203A	566355	285360	150.0	160.0	R								1		155.0
MW-203B	566351	285359	95.0	105.0	O								1		100.0
MW-204A	565669	285566	89.0	114.0	R					1					101.5
MW-204B	565652	285569	68.0	78.0	O					1					73.0
MW-205A	565559	284997	123.5	133.5	R						1				128.5
MW-205B	565551	284992	39.0	49.0	O					1					44.0

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
MW-206A	565732	284158	115.5	125.5	R								1		120.5
MW-206B	565726	284159	79.0	89.0	O								1		84.0
MW-207A	565484	284175	103.0	113.0	R								1		108.0
MW-208A	565678	283622	111.0	121.0	R								1		116.0
MW-209A	564582	286263	18.0	38.0	R			1							28.0
MW-209B	564582	286258	12.0	15.0	O			1							13.5
MW-408	565318	286324	31.6	51.2	R									1	41.4
MW-409	565320	286332	6.7	16.3	O									1	11.5
MW-410	565305	286329	7.1	11.7	O									1	9.4
MW-411	565299	286341	31.3	50.9	R									1	41.1
MW-412	565302	286335	16.0	21.0	O									1	18.5
MW-413	565278	286350	14.8	19.8	O	1									17.3
MW-414	565273	286339	30.2	49.8	R									1	40.0
MW-415	565275	286346	6.8	11.8	O	1									9.3
MW-416	565264	286291	29.4	49.4	R	1									39.4
MW-501A	565838	286346	86.0	91.0	R					1					88.5
MW-501B	565837	286343	55.0	65.0	O					1					60.0
MW-501C	565838	286350	20.0	30.0	O					1					25.0
MW-502	565495	286270	15.0	35.0	O				1						25.0
MW-701DR	564579	286254	93.3	107.8	R		1								100.6
MW-702DR	564912	286075	80.3	110.3	R						1				95.3
MW-703D	565300	285097	74.0	84.0	O					1					79.0
MW-703DR	565299	285073	144.3	174.3	R					1					159.3
MW-703S	565299	285087	25.0	35.0	O					1					30.0
MW-704D	565540	285591	53.0	63.0	O				1						58.0
MW-704DR	565552	285565	102.0	132.0	R				1						117.0
MW-704M	565557	285574	37.0	47.0	O				1						42.0
MW-704R	565568	285583	79.0	89.0	R					1					84.0
MW-704S	565557	285583	4.0	19.0	O					1					11.5
MW-705D	565421	286754	25.0	35.0	O					1					30.0
MW-705DR	565429	286750	90.0	100.0	R				1						95.0
MW-705R	565422	286744	44.0	54.0	R					1					49.0
MW-706DR	565668	286216	116.5	126.5	R				1						121.5
MW-707D	565599	285102	84.9	94.9	O					1					89.9
MW-707DR	565567	285124	162.0	192.0	R				1						177.0
MW-707M	565605	285109	58.0	68.0	O					1					63.0
MW-707R	565599	285115	115.0	125.0	R					1					120.0
MW-707S	565608	285116	20.0	30.0	O					1					25.0

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
MW-708S	566241	286418	83	93	O						1				88.0
MW-708M	566245	286405	116	126	O						1				121.0
MW-708R	566254	286408	179.4	189.4	R						1				184.4
MW-708DR	566251	286424	236.1	266.1	R						1				251.1
MW-709R	565403	287092	50	70	R					1					60.0
MW-709DR	565403	287092	120	134	R					1					127.0
MW-710S	566112	284847	32.2	42.2	O						1				37.2
MW-710R	566110	284836	133.5	143.5	R					1					138.5
MW-710DR	566113	284857	186.5	206.5	R					1					196.5
MW-801S	565124	285425	8.0	18.0	O						1				13.0
MW-801R	565126	285430	35.0	45.0	R						1				40.0
MW-901D	564832	286257	8	13	O		1					1			10.5
MW-901R	564831	286263	25	40	R		1					1			32.5
MW-902M	565213	286256	12.5	17.5	O	1						1			15.0
MW-902D	565215	286258	19	24	O	1						1			21.5
MW-903S	565732	286084	19	29	O					1		1			24.0
MW-903M	565838	285910	70.6	80.6	O					1		1			75.6
MW-903D	565844	285903	93	103	O					1		1			98.0
MW-903R or DR	565850	285890	180	195	R					1		1			TBD
PZ-903R or DR	565850	285890	130	145	R						1	1			TBD
MW-904S	565785	286237	5	15	O					1		1			10.0
MW-904D	565848	286365	69	79	O					1		1			74.0
MW-905M	565262	285851	17	26	O					1		1			21.5
MW-906M	565710	286741	30	40	O					1		1			TBD
MW-906D	565708	286745	50	60	O					1		1			TBD
MW-906R or DR	565706	286743	165	180	R					1		1			TBD
PZ-906R or DR	565706	286743	98	113	R						1	1			TBD
MW-907M	565540	285997	28.1	38.1	O				1			1			33.1
MW-907D	565548	285990	40	50	O				1			1			45.0
MW-907DR	565530	285980	159	174	R				1			1			166.5
PZ-907R	565530	285980	108	123	R						1	1			115.5
MW-908D	565300	286107	24.9	29.9	O					1		1			27.4
MW-909D	565347	286539	22.7	27.7	O					1		1			25.2
MWD-601	565228	286572	21.4	26.4	O									1	23.9
MWL-301	565261	286598	1.0	11.0	O									1	6.0
MWL-302	565359	286603	1.0	11.0	O								1		6.0
MWL-303	565457	286604	1.0	11.0	O					1					6.0
MWL-304	565265	286466	1.0	11.0	O	1									6.0
MWL-305	565354	286450	1.0	11.0	O								1		6.0
MWL-306	565502	286450	1.0	11.0	O								1		6.0
MWL-307	565259	286297	1.0	11.0	O	1									6.0

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
MWL-308	565354	286304	1.0	11.0	O								1		6.0
MWL-309	565505	286302	1.0	11.0	O				1						6.0
MWL-310	565251	286147	0.5	10.5	O									1	5.5
MWL-311	565351	286149	1.0	11.0	O								1		6.0
MWL-312	565509	286154	1.0	11.0	O					1					6.0
MWL-313	565352	285992	1.0	11.0	O					1					6.0
MWL-314	565502	286001	1.0	11.0	O						1				6.0
P-10	565316	286803	9.0	14.0	O								1		11.5
P-101A	565674	286226	66.0	96.0	R					1					81.0
P-101B	565675	286232	34.0	44.0	O				1						39.0
P-101C	565676	286238	3.0	13.0	O				1						8.0
P-102A	565702	286458	81.0	91.0	R					1					86.0
P-102B	565702	286465	29.0	39.0	O					1					34.0
P-102C	565702	286472	3.0	13.0	O					1					8.0
P-11A	565583	286220	58.0	68.0	R				1						63.0
P-11B	565583	286220	9.0	14.0	O					1					11.5
P-12	565321	287115	9.0	14.0	O		1								11.5
P-12A	565321	287105	30.0	50.0	R								1		40.0
P-13	565242	285851	4.9	14.9	O				1						9.9
P-14	565582	286212	79.0	89.0	R								1		84.0
P-15	564917	285631	24.0	34.0	R									1	29.0
P-16	565129	286518	7.5	12.5	O									1	10.0
P-1A	565124	286367	26.0	36.0	R									1	31.0
P-1B	565125	286372	10.8	15.8	O									1	13.3
P-2A	565118	286221	22.0	32.0	R									1	27.0
P-2B	565116	286223	11.0	16.0	O									1	13.5
P-3A	565576	286459	54.5	64.5	R					1					59.5
P-3B	565570	286457	13.0	17.0	O					1					15.0
P-4A	565008	286294	20.0	30.0	R									1	25.0
P-4B	565011	286294	9.8	14.8	O									1	12.3
P-5A	565394	286291	42.5	52.5	R								1		47.5
P-5B	565391	286283	4.0	9.0	O					1					6.5
P-6	565500	286294	47.5	57.5	R					1					52.5
P-7	565439	286805	11.5	16.5	O								1		14.0
P-8	564918	286064	14.9	19.9	O						1				17.4
P-8A	564921	286067	58.0	70.0	R						1				64.0
P-9	565412	286584	8.0	13.0	O								1		10.5
PW-406	565291	286337	29.8	49.8	R									1	39.8

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
PW-407	565291	286331	5.7	17.7	O									1	11.7
PZO-1	565335	286384	11.0	16.0	O									1	13.5
PZO-2	565351	286370	11.0	16.0	O									1	13.5
PZO-2D	565578	285340	75.0	85.0	O				1						80.0
PZO-2M	565586	285328	46.0	56.0	O				1						51.0
PZO-3	565313	286507	12.6	17.6	O									1	15.1
PZO-3D	565726	285210	88.0	98.0	O					1					93.0
PZO-3M	565736	285211	46.0	56.0	O					1					51.0
PZO-4	565395	286243	12.5	17.5	O									1	15.0
PZO-4M	565369	285471	29	39	O					1		1			34.0
PZO-4D	565367	285473	46	56	O					1		1			51.0
PZO-5	564621	287042	7.7	12.7	O								1		10.2
PZO-6	564176	285978	5.6	9.6	O								1		7.6
PZO-6S	565487	285569	12.0	22.0	O								1		17.0
PZO-7	564951	286483	4.1	6.1	O									1	5.1
PZO-121S	565547	285820	1.7	11.7	O						1				6.7
PZO-204M	565658	285562	45.7	55.7	O					1					50.7
PZO-204S	565649	285565	2.7	12.7	O								1		7.7
PZR-1	565331	286383	29.5	34.5	R									1	32.0
PZR-1R*	565722	285404	103.0	123.0	R						1				113.0
PZR-2	565349	286365	29.0	34.0	R									1	31.5
PZR-2DR*	565579	285319	184.0	204.0	R					1					194.0
PZR-2R*	565562	285330	120.5	140.5	R				1						130.5
PZR-3	565264	286622	30.0	35.0	R									1	32.5
PZR-3R*	565745	285220	120.3	140.3	R					1					130.3
PZR-4	565355	286289	33.0	38.0	R									1	35.5
PZR-4R*	565369	285471	69.7	89.7	R					1					79.7
PZR-4DR*	565388	285464	135.0	155.0	R					1					145.0
PZR-5	564616	287042	31.2	46.2	R								1		38.7
PZR-5R*	565280	285532	53.0	73.0	R					1					63.0
PZR-6	564177	285975	27.3	42.3	R								1		34.8
PZR-7	564948	286483	26.8	41.8	R									1	34.3
RW-1	565265	286133	14.5	27	O						1				20.8
RW-1R*	565571	285561	82	172	R						1				127.0
RW-2	565377	286288	19	31.5	O						1				25.3
RW-3	565365	286384	18	28	O						1				23.0
RW-4	565314	286498	9.9	21	O						1				15.5
RW-5	565250	286570	10.21	20.21	O									1	15.2

See Notes on Page 7.

Table N-2.
Well Construction Information and Network Modifications
SRSNE Superfund Site, Southington, CT

Location	Easting (X)	Northing (Y)	Screen Top Depth (feet bgs)	Screen Bottom Depth (feet bgs)	Well Fm.	NTCRA 1 Area (N)	Bkgd. Metals and MNA (M)	Bkgd. Metals (B)	Routine Plume Monitoring (R)	Compreh. Rounds Only (C)	WL Only (W)	Install	Dormant (Retain)	Abandon (X)	Targeted Sampling Depth (ft bgs)
RW-6	565225	286413	10.14	20.14	O						1				15.1
RW-7	565223	286113	8.58	18.58	O						1				13.6
RW-8	565304	286179	11	26	O						1				18.5
RW-9	565344	286238	10.81	30.81	O						1				20.8
RW-10	565370	286333	8.27	33.27	O						1				20.8
RW-11	565354	286446	8.84	23.84	O						1				16.3
RW-12	565281	286161	12.5	27.5	O						1				20.0
RW-13	565560	285602	35	75	O						1				55.0
RW-14	565534	285573	31	71	O						1				51.0
SRS-1	565194	285871	17	22	O					1					19.5
SRS-2	565200	285871	5.5	10.5	O								1		8.0
SRS-3	565394	285864	31	41	O					1					36.0
SRS-4	565392	285868	5	15	O								1		10.0
SRS-5	565530	285997	7	37	O								1		22.0
SRS-6	565578	286010	30.09	69.84	O								1		50.0
TW-07A	565393	286384	15.8	25.8	O								1		20.8
TW-08A	565213	286406	4	14	O	1									9.0
TW-08B	565213	286406	21.5	31.5	R	1									26.5
TW-08D	565213	286406	17	22	O	1						1			19.5
TW-09	564984	286593	19.5	29.5	R									1	24.5
TW-10	564882	286403	25.5	35.5	R									1	30.5
TW-11	565282	285956	5.5	15.5	O								1		10.5
WE-1	565220	286787	27	41.5	R								1		34.3
WE-2	565220	286808	3	13.5	O								1		8.3
WE-3	565140	286142	28	31	R									1	29.5
WE-5	565139	286144	1.5	11.5	O									1	6.5
WE-6	564936	286481	4.8	5.8	R									1	5.3
						10	5	3	26	80	36	26	58	40	
										Total Wells Proposed for Sampling:	124				

Notes:

1) Shading indicates proposed wells, installation locations and depth intervals are estimates only, and will be verified in the field based on actual geologic conditions, water table depth, and/or site accessibility constraints.
2) Fm. = Formation
   OVB = overburden
   TOR = top of rock
   MW = monitoring well
   WL = water level
   bgs = below ground surface
   TBD = to be determined
3) Wells listed as "Dormant" are not currently proposed for monitoring during the RD/RA Program, but will be retained for potential future use (as appropriate).
4) Targeted sampling depths at the proposed monitoring wells will be the midpoint of the screened interval; specific depths to be determined based on final well construction details.

ARCADIS

Figures

STUDY AREA

FAWN ROAD

HART STREET

CURTISS STREET

KANE STREET

RAILROAD RIGHT-OF-WAY

CURTISS STREET

PRODUCTION WELL NO. 6

PRODUCTION WELL NO. 4

FORMER IDEAL FORGING

NORTH MAIN STREET

TOWN WELL FIELD PROPERTY

INTERMITTEN...

CL & P EASEMENT

CL&P EASEMENT

NTCRA 2 EXTRACTION WELLS

RW-14

RW-13

RW-1R

TOWN WELL FIELD PROPERTY

FORMER SRSNE OPERATIONS AREA

NTCRA 1 CONTAINMENT AREA

FORMER CIANCI PROPERTY

LAZY LANE

QUINNIPIAC RIVER

(CONN. ROUTE 10)

QUEEN STREET

LANDERS STREET

LEGEND:

170 GROUND SURFACE INDEX ELEVATION CONTOUR (10 FT. CONTOUR INTERVAL)

GROUND SURFACE INTERMEDIATE ELEVATION CONTOUR (2 FT. CONTOUR INTERVAL)

NOTE:

MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

0 300' 600'

GRAPHIC SCALE

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

STUDY AREA

ARCADIS

FIGURE
N-1

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER PM: M. GEFELL TR: R. STEVENSON LYR: ON=*;OFF=*REF,(FRZ)
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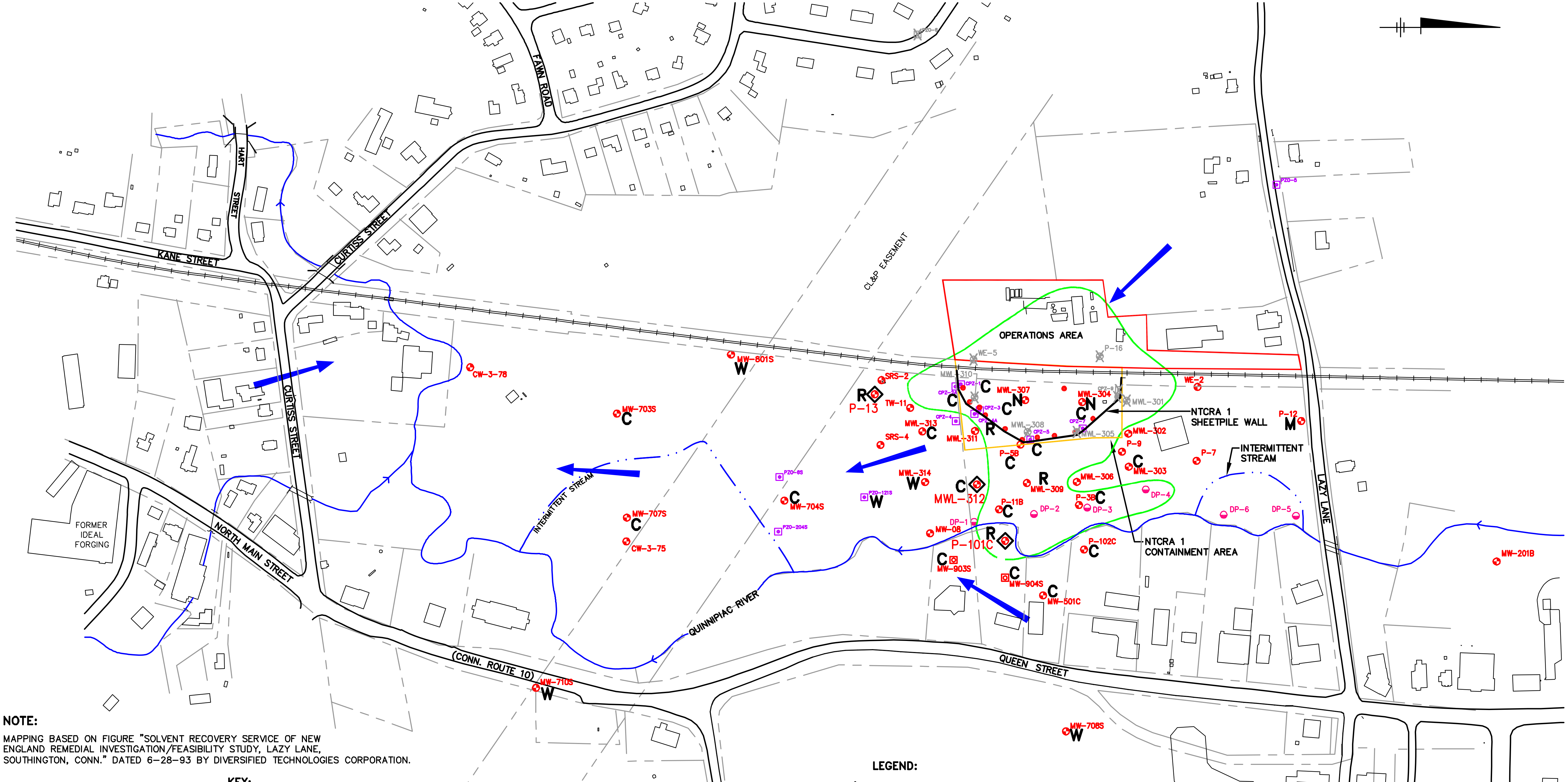


NOTE:

MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONN." DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

KEY:

- **N** NTCRA 1 AREA MONITORING WELL
- **M** BACKGROUND MONITORING WELL FOR METALS SAMPLING ONLY
- **R** MONITORING WELL FOR ROUTINE VOC AND MNA MONITORING
- **C** MONITORING WELL FOR COMPREHENSIVE SAMPLING ROUNDS ONLY
- **W** MONITORING WELL FOR WATER LEVEL MEASUREMENT ONLY
- X WELL PROPOSED FOR ABANDONMENT

NOTE: NON-GRAY WELLS AND PIEZOMETERS WITH NO BOLD BLACK LETTER PROPOSED FOR DORMANT STATUS.

LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- SHALLOW OVERBURDEN MONITORING WELL
- NTCRA 1 EXTRACTION WELL
- PIEZOMETER
- NTCRA 1 WETLAND DRIVEPOINT
- PROPOSED MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF MCLs OR CTDEP CLASS GA GWPCs (MOST RECENT SAMPLING RESULTS FOR EACH WELL THROUGH APRIL 2005)
- GENERALIZED GROUNDWATER FLOW DIRECTION

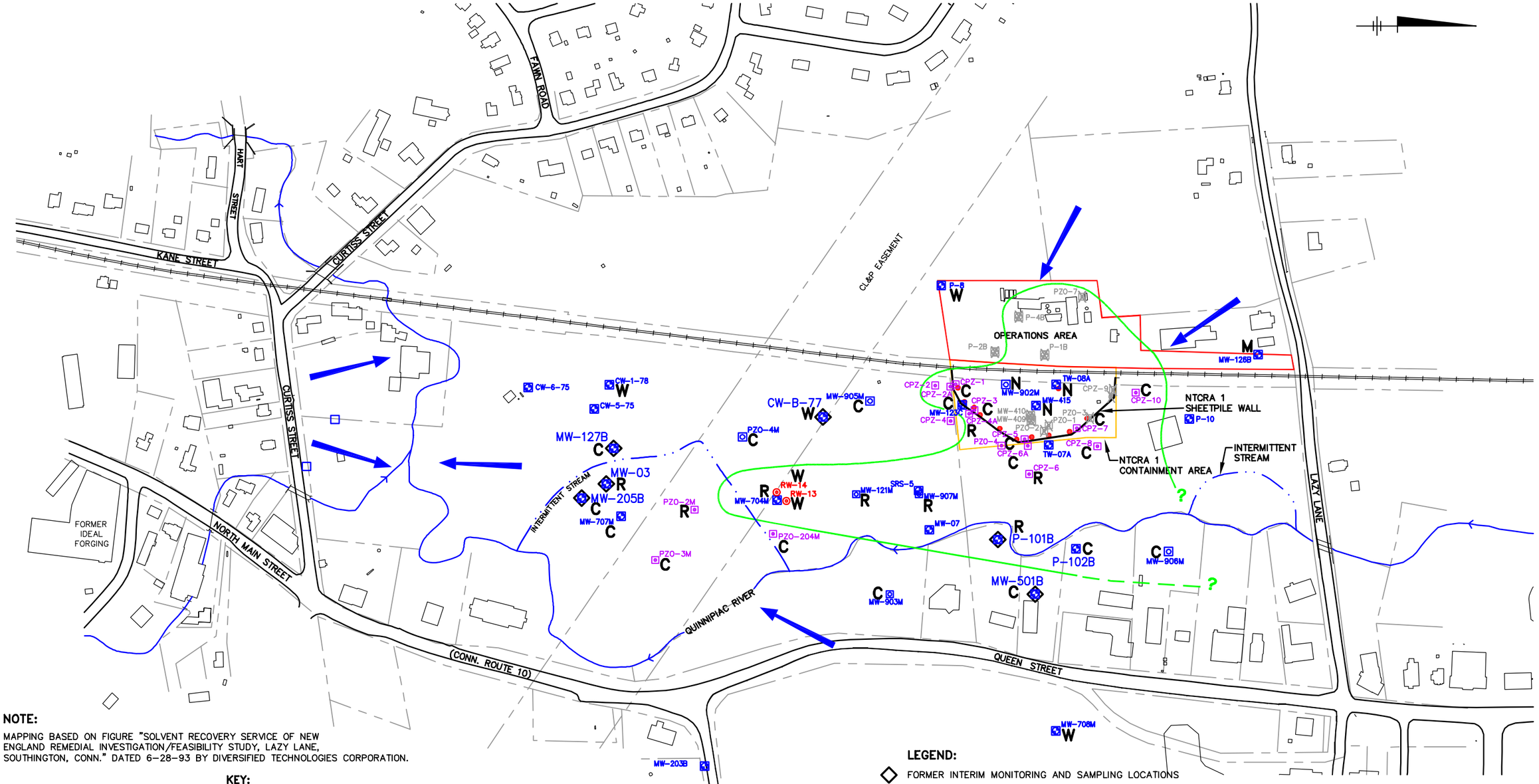
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

PROPOSED GROUNDWATER MONITORING NETWORK - SHALLOW OVERBURDEN

ARCADIS

FIGURE **N-2**



NOTE:

MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONN." DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

KEY:

- N NTCRA 1 AREA MONITORING WELL
- M BACKGROUND MONITORING WELL FOR METALS SAMPLING ONLY
- R MONITORING WELL FOR ROUTINE VOC AND MNA MONITORING
- C MONITORING WELL FOR COMPREHENSIVE SAMPLING ROUNDS ONLY
- W MONITORING WELL FOR WATER LEVEL MEASUREMENT ONLY
- X WELL PROPOSED FOR ABANDONMENT

NOTE: NON-GRAY WELLS AND PIEZOMETERS WITH NO BOLD BLACK LETTER PROPOSED FOR DORMANT STATUS.

LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- MIDDLE OVERBURDEN MONITORING WELL
- NTCRA 1 EXTRACTION WELL
- NTCRA 2 EXTRACTION WELL
- PIEZOMETER
- PROPOSED MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF MCLs OR CTDEP CLASS GA GWPCs (MOST RECENT SAMPLING RESULTS FOR EACH WELL THROUGH APRIL 2005)
- GENERALIZED GROUNDWATER FLOW DIRECTION

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

PROPOSED GROUNDWATER MONITORING NETWORK - MIDDLE OVERBURDEN

ARCADIS

FIGURE
N-3

CITY: SYRACUSE, NY GROUP: ENVCAD DB: P. LISTER PM: M. GEFELL TM: M. GEFELL TR: R. STEVENSON LYR: ON=*;OFF=REF, (FRZ)
G:\ENV\CAD\SYRACUSE\ACT\B0054634\00001\00141\DWG\MWNE\54634C03.DWG LAYOUT: N-3 SAVED: 4/15/2009 11:51 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/15/2009 2:08 PM BY: LISTER, PAUL
XREFS: IMAGES: PROJECTNAME: ---
54634X01
54634XBL

KANE STREET
HART STREET
CURTISS STREET
FAWN ROAD
CL&P EASEMENT
OPERATIONS AREA
NTCRA 1 SHEETPILE WALL
NTCRA 1 CONTAINMENT AREA
INTERMITTENT STREAM
LAZY LANE
FORMER IDEAL FORGING
NORTH MAIN STREET
(CONN. ROUTE 10)
QUINNIPIAC RIVER
QUEEN STREET
FLANDERS STREET

MW-209B
MW-901D
PZO-7
TW-08D
MW-902D
MW-413
MWD-601
MW-412
MW-908D
MW-909D
MW-705D
CPZ-5
CPZ-6A
MW-502
MW-907D
SRS-6
MW-121B
MW-704D
RW-14
RW-13
PZO-2D
MW-04
MW-204B
MW-707D
PZO-3D
MW-206B
MW-06
MW-903D
MW-904D
MW-906D
MW-202B
CW-2-78
CW-4-78
CW-5-78
CW-6-78
CW-4-75
PZO-4D
MW-703D
MW-02
MW-01
SRS-1
SRS-3
DW-3

KEY:

- N NTCRA 1 AREA MONITORING WELL
- M BACKGROUND MONITORING WELL FOR METALS SAMPLING ONLY
- R MONITORING WELL FOR ROUTINE VOC AND MNA MONITORING
- B BACKGROUND MONITORING WELL FOR METALS AND MNA SAMPLING
- C MONITORING WELL FOR COMPREHENSIVE SAMPLING ROUNDS ONLY
- W MONITORING WELL FOR WATER LEVEL MEASUREMENT ONLY
- X WELL PROPOSED FOR ABANDONMENT

NOTE: NON-GRAY WELLS AND PIEZOMETERS WITH NO BOLD BLACK LETTER PROPOSED FOR DORMANT STATUS.

LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- DEEP OVERBURDEN MONITORING WELL
- NTCRA 1 EXTRACTION WELL
- PIEZOMETER
- NTCRA 2 EXTRACTION WELL
- PROPOSED MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF MCLs OR CTDEP CLASS GA GWPCs (MOST RECENT SAMPLING RESULTS FOR EACH WELL THROUGH APRIL 2005)
- GENERALIZED GROUNDWATER FLOW DIRECTION

NOTE:

MAPPING BASED ON FIGURE "SOLVENT RECOVERY SERVICE OF NEW ENGLAND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LAZY LANE, SOUTHINGTON, CONNECTICUT" DATED 6-28-93 BY DIVERSIFIED TECHNOLOGIES CORPORATION.

0 300' 600'

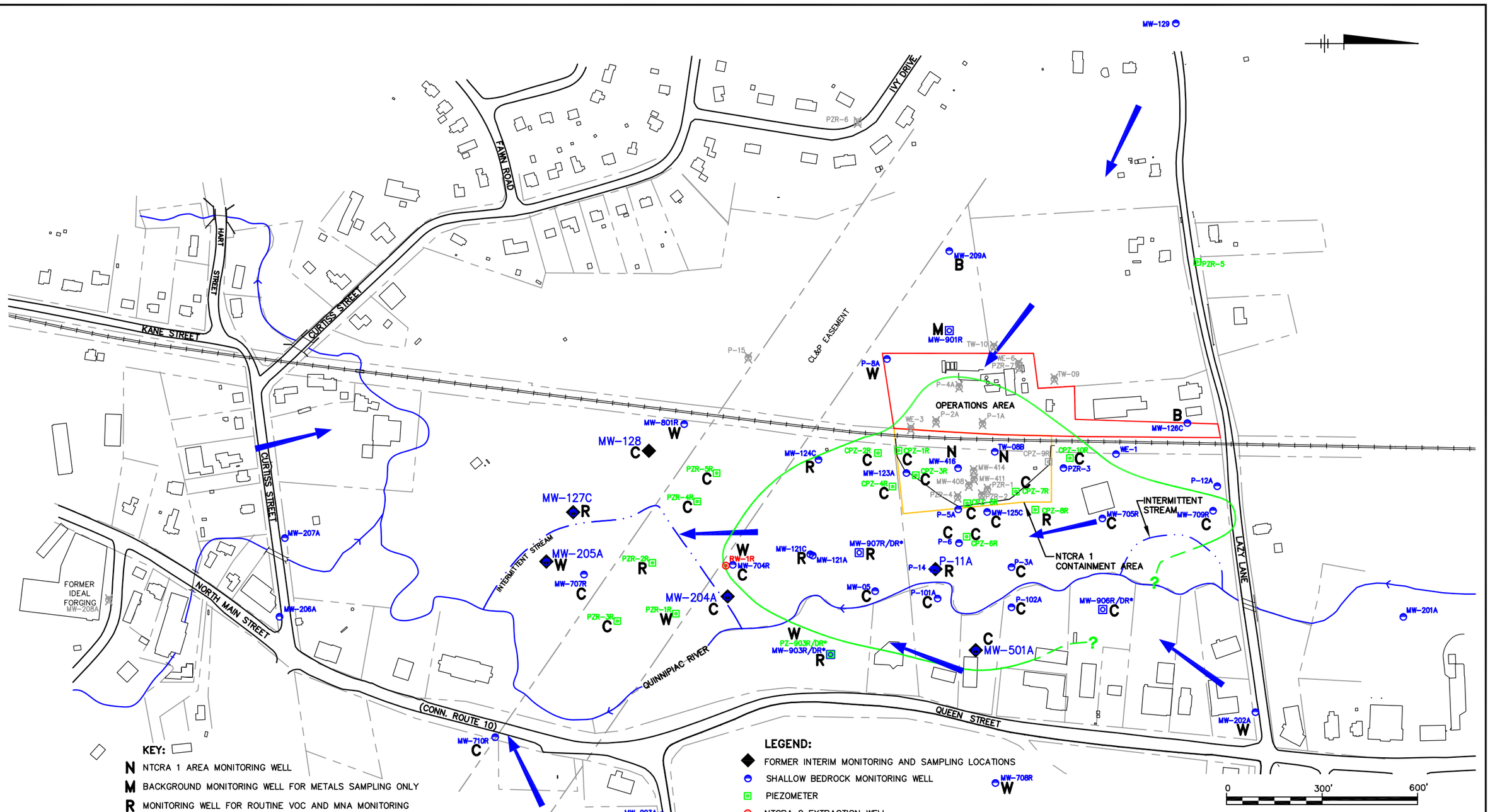
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

PROPOSED GROUNDWATER MONITORING NETWORK - DEEP OVERBURDEN

ARCADIS

FIGURE
N-4



KEY:

- **N** NTCRA 1 AREA MONITORING WELL
- **M** BACKGROUND MONITORING WELL FOR METALS SAMPLING ONLY
- **R** MONITORING WELL FOR ROUTINE VOC AND MNA MONITORING
- **B** BACKGROUND MONITORING WELL FOR METALS AND MNA SAMPLING
- **C** MONITORING WELL FOR COMPREHENSIVE SAMPLING ROUNDS ONLY
- **W** MONITORING WELL FOR WATER LEVEL MEASUREMENT ONLY
- X WELL PROPOSED FOR ABANDONMENT

NOTES:

1. * A SHALLOW OR DEEP BEDROCK WELL WILL BE INSTALLED AT THIS LOCATION. FINAL DEPTH WILL BE BASED ON VERTICAL PROFILING DURING DRILLING.
2. NON-GRAY WELLS AND PIEZOMETERS WITH NO BOLD BLACK LETTER PROPOSED FOR DORMANT STATUS.

LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- SHALLOW BEDROCK MONITORING WELL (MW-708R W)
- PIEZOMETER
- NTCRA 2 EXTRACTION WELL
- PROPOSED MONITORING WELL
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF MCLs OR CTDEP CLASS GA GWPCs (MOST RECENT SAMPLING RESULTS FOR EACH WELL THROUGH APRIL 2005)
- GENERALIZED GROUNDWATER FLOW DIRECTION

NOTE:

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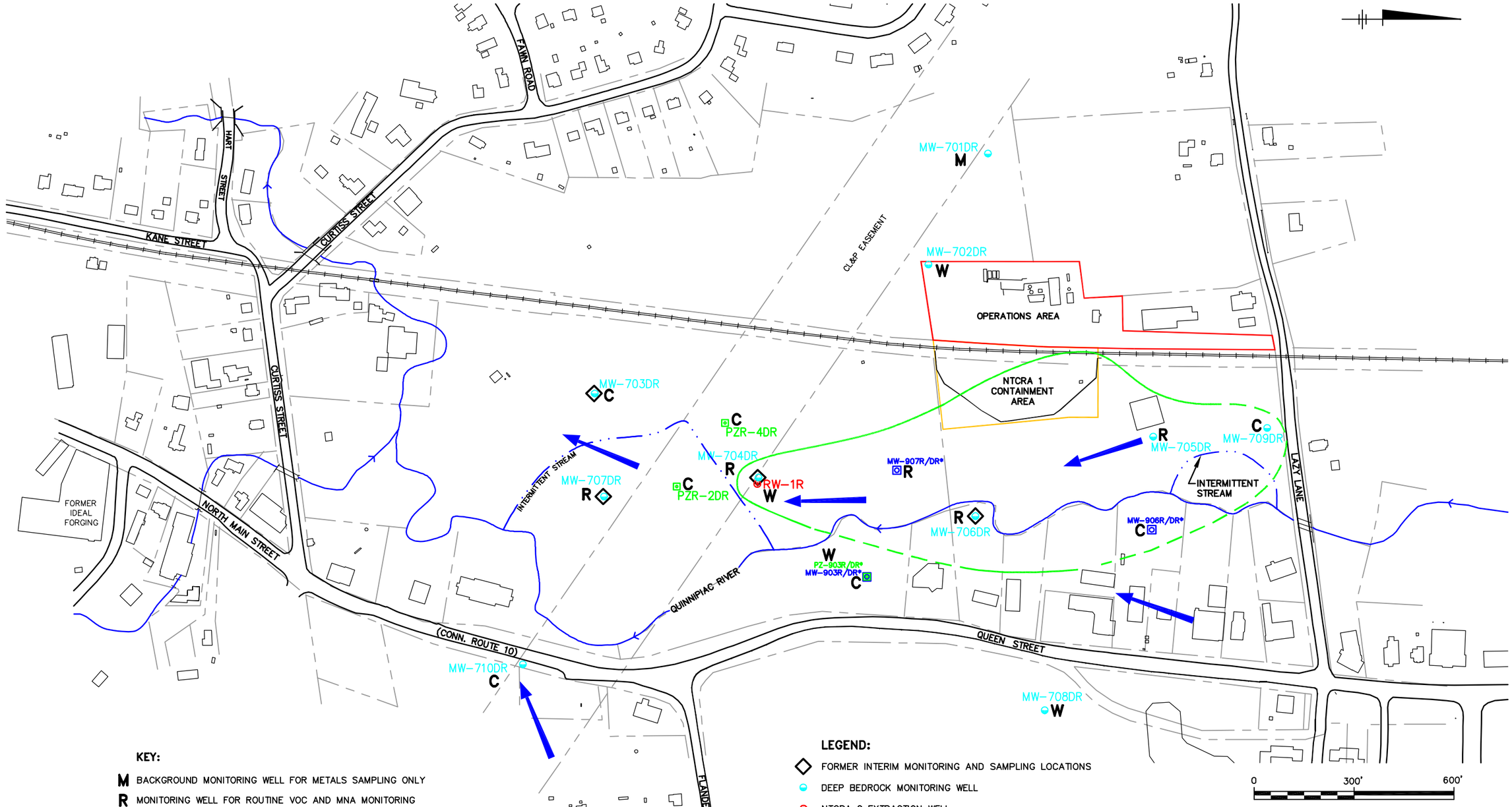
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

PROPOSED GROUNDWATER MONITORING NETWORK - SHALLOW BEDROCK

ARCADIS

FIGURE
N-5



KEY:

- **M** BACKGROUND MONITORING WELL FOR METALS SAMPLING ONLY
- **R** MONITORING WELL FOR ROUTINE VOC AND MNA MONITORING
- **C** MONITORING WELL FOR COMPREHENSIVE SAMPLING ROUNDS ONLY
- **W** MONITORING WELL FOR WATER LEVEL MEASUREMENT ONLY
- **X** WELL PROPOSED FOR ABANDONMENT

NOTE:

* A SHALLOW OR DEEP BEDROCK WELL WILL BE INSTALLED AT THIS LOCATION. FINAL DEPTH WILL BE BASED ON VERTICAL PROFILING DURING DRILLING.

LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- DEEP BEDROCK MONITORING WELL
- NTCRA 2 EXTRACTION WELL
- PIEZOMETER
- ESTIMATED EXTENT OF GROUNDWATER VOC EXCEEDANCES OF MCLs OR CTDEP CLASS GA GWPCs (MOST RECENT SAMPLING RESULTS FOR EACH WELL THROUGH APRIL 2005)
- GENERALIZED GROUNDWATER FLOW DIRECTION

NOTE:

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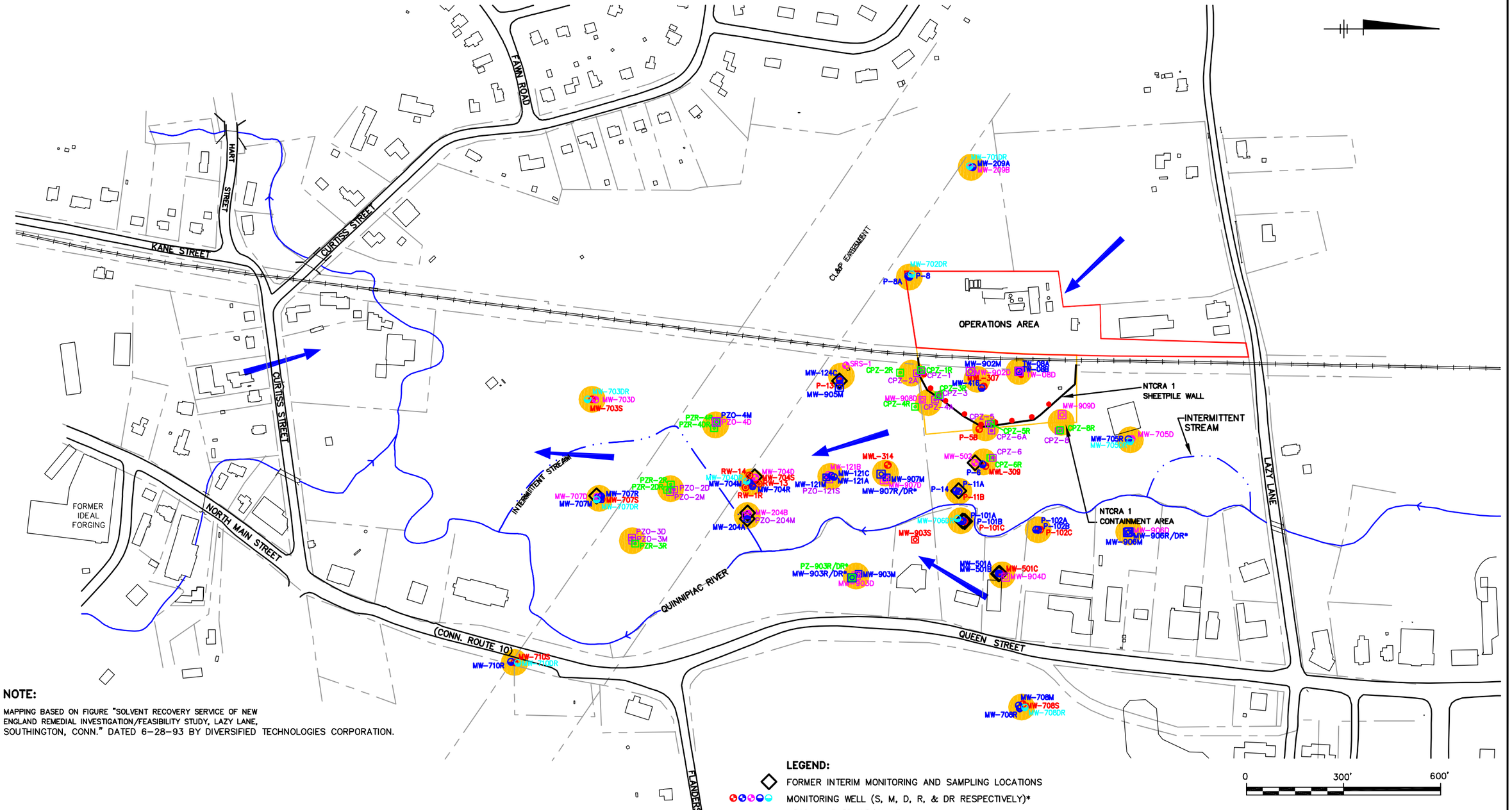
SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

PROPOSED GROUNDWATER MONITORING NETWORK - DEEP BEDROCK

ARCADIS

FIGURE
N-6



NOTE:

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LEGEND:

- FORMER INTERIM MONITORING AND SAMPLING LOCATIONS
- MONITORING WELL (S, M, D, R, & DR RESPECTIVELY)*
- NTCRA 1 EXTRACTION WELL
- NTCRA 2 EXTRACTION WELL
- PROPOSED MONITORING WELL
- PIEZOMETER (S, M, D, R, & DR RESPECTIVELY)*
- GENERALIZED GROUNDWATER FLOW DIRECTION
- * S=SHALLOW OVERBURDEN, M=MIDDLE OVERBURDEN, D=DEEP OVERBURDEN, R=SHALLOW BEDROCK, DR=DEEP BEDROCK
- WELL CLUSTER LOCATION

SRSNE SUPERFUND SITE
SOUTHINGTON, CONNECTICUT

MONITORING WELL NETWORK EVALUATION AND GROUNDWATER MONITORING PROGRAM

MONITORING WELL CLUSTER LOCATION MAP

ARCADIS

FIGURE
N-7