

Land Use Assessment for the City of DuPont Comprehensive Plan Update



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City of DuPont

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Sign-off Sheet

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1.0 INTRODUCTION

City of DuPont (City) retained Stantec to assess conditions of the Former DuPont Works Site (Site) and evaluate the potential for rezoning sub parcels of the Site during an ongoing comprehensive plan update. This document analyzes existing chemical data and legal documents associated with the Site, with a goal of recommending a course of future action to the City.

2.0 PURPOSE AND SCOPE

The purpose of this task was to review relevant project documents to assess soil conditions within the Golf Course Area Parcels (see Figure 1) including the Site Remedial Investigation (RI)/Feasibility Study (FS), Risk Assessment (RA), Site Closure Plan and supporting documents. For groundwater, Stantec based conclusions and recommendations in this Technical Memorandum on the 2016 5-Year Review (Ecology 2016). Soil assessment in this Technical Memorandum uses the Final Closure Report Data Summary (PERC 2007) as the basis of its conclusions based on:

1. The latest soil testing results appear to be confirmatory samples collected during removal actions in 2003-2004 and are documented in the Final Closure Report (PERC 2007). Prior data is no longer valid as material was removed and data collected prior to the Closure Report no longer represents site conditions.
2. The historical and in-fill areas are rigorously documented and were clearly assessed and delineated during this action.
3. Remaining soil contamination (except for a few locations containing heavy oil) that exceeded cleanup criteria is limited to metals (arsenic and lead). Metals typically do not degrade in place and can be assumed to be at or near concentrations reported in 2007.
4. The most recent groundwater data is in the periodic review document and is assumed to be the most accurate. Groundwater has been listed as No Further Action by Ecology (Ecology 2016).

Currently, all identified sub parcels (See Attachment 1) are under a consent decree with the Washington State Department of Ecology (Ecology), with restrictive covenants prohibiting certain types of development of these parcels. Based on the letter to the Mayor of DuPont from Mike Blum at Ecology, dated November 15, 1999, it is clear that the golf course and historical areas are prohibited from any reuse, however, it is also

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clear in the Restrictive Covenant dated 12, July 2006 that the Restrictive Covenant allows commercial development in the commercial (CM) areas. These areas have specific prohibitions for unrestricted use, including most of, if not all, forms of residences. This appears to be a blanket prohibition that was based on general, rather than specific site conditions. Changes in use of portions of these areas (as well as use of the Open Space parcels) may be possible if area-specific data is considered. This must be negotiated with Ecology. It is clear from the existing documents that commercial development is allowed for lot 119272005 and it is not clear that all residential development is prohibited.

The scope of this review was to review existing project documentations and site history to determine the nature and extent of residual site contamination, and using this information, evaluate individual sub parcels of the site for possible re-designation during the City of DuPont's current efforts to revise their comprehensive plan.

2.1 HISTORY OF SITE

The Site was used for manufacturing commercial explosives from 1909 to 1976. Production of explosive materials ceased, and decommissioning of the buildings began in 1976, when Weyerhaeuser purchased the property from DuPont. As part of the cleanup process, asbestos was removed, salvageable materials were recovered, and structures were either burned or demolished. All document references are detailed in the Final Closure Plan (PERC 2007), and are not detailed here. Actions taken at the Site following the shutdown in 1976 include the following:

- In 1985, Weyerhaeuser initiated studies to determine if hazardous substances were present.
- In 1986, a Phase I Site Survey and Review was conducted to identify areas on Site that may have been of environmental concern.
- In 1986, soil contamination was first documented and reported to Ecology.
- In 1987, a Phase II Site Characterization study was performed, which characterized the type, concentration, and distribution of constituents at 38 areas on Site. In 1989, a Baseline Human Health Risk Assessment was performed using results of the Phase II study.
- In 1991, the Companies signed a Consent Decree (No. 91 2 01703 1) with Ecology, where they agreed to study the site and complete an RI, RA, and FS. The property was then divided into two main areas: Parcel 1 (approximately 841 acres), and Parcel 2 (approximately 205 acres).

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- In 1994 and 1995, draft RI, RA, and FS reports were submitted to Ecology and underwent public review.
- In 1996, based on the results of interim source removal actions, Ecology approved a CAP for Parcel 2. The CAP allowed for no further remediation activities at Parcel 2, except for the institutional controls that maintained the industrial use of Parcel 2.
- In 1997, Parcel 2 was deleted from the Consent Decree, and the deed requiring institutional controls to maintain the industrial use was recorded in the Pierce County Assessor's Office.
- Between 1990 and 2002, while studies and negotiations were ongoing, the Companies undertook interim source removal actions to cleanup soil and/or debris at the Site, in accordance with the Model Toxics Control Act (MTCA) and the Consent Decree.
- In 2003, to fulfill the provisions of the Consent Decree, final RI, RA, and FS reports were prepared. A description of the contents of each of these reports is presented below.
 - Remedial Investigation – The purpose of the RI was to collect sufficient information regarding the Site to enable the completion of the RA and FS. The RI characterized the nature and extent of contamination based on the existing conditions at the Site. The RI report presented the analytical data for the media that were sampled at the Site. The data were presented for each RI area, which were defined based on historical manufacturing and production operations at the Site.
 - Risk Assessment – The RA evaluated Site conditions in relation to future land uses. The RA identified default soil cleanup levels (CLs) used for screening and presented the methods used to derive Site-specific remediation levels (RLs) protective of human health and ecological receptors based on future land use. These CLs and RLs were compared to Site-specific constituent concentrations to identify areas requiring additional evaluation in the FS.
 - Feasibility Study – The FS evaluated potential cleanup methods designed to meet the remedial action objectives for the Site. The FS report provided information for the Companies to recommend options for remediation of selected areas, including both no action and action methods. Ecology evaluated the FS and selected the remedial measures it believed were appropriate.
- In 2003, the Companies completed the detailed design and implementation of the remedial measures selected by Ecology in the CAP. This decision was

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captured in a new Consent Decree (No. 03 2 10484 7), which was agreed to by the Weyerhaeuser, DuPont and Ecology and was entered by the Court on August 15, 2003.

Remedial actions at the Site included interim remedial actions (IRAs), localized removal at miscellaneous small units (MSUs) (e.g., removal of debris piles and stockpiles), tree remediation, large-scale excavation focused on arsenic and lead impacted surface soil, and capping. These remedial actions occurred in several areas of the Site, and are discussed separately for each future land use area (Commercial [CM], Golf Course [GC], Industrial [IN], Historical [HI], and Open Space [OS] Areas). This is detailed in the Final Closure Report (PERC 2007). In general, these remedial actions consisted of the following:

- **Interim Remedial Actions:** IRAs were localized soil and/or debris removal actions conducted to minimize the potential for transport of residual constituents in soil, to protect groundwater (thereby minimizing potential future environmental impacts), to improve the safety and environmental conditions at the Site, to remove debris and facilitate a more complete and accurate RI, and to prepare for the final remediation of the Site. Materials were recycled off Site, incinerated off Site, or sent to an approved landfill. IRAs were completed around former Bunker-C pipelines and above-ground storage tanks, around building foundations, the former narrow gauge railroad, the soil and sand laydown areas, along a 250-foot swath of land on the southern perimeter of the Site, and in areas where there were elevated mercury concentrations.
- **Localized Removal at Miscellaneous Small Units:** MSUs were identified as areas where isolated, small occurrences of TPH, mercury, DNT and TNT, nitrobenzene, benzo(a)pyrene, aldrin, tetrachloroethylene, copper and/or arsenic/lead were found in subsurface soil (e.g., soil at a depth greater than one foot bgs). MSUs represented less than one percent of the total volume of contaminated soil on Site. Some of the soil from the MSUs was excavated and disposed of on Site in placement areas (PAs) within the GC, and some was transported off Site for disposal at an Ecology/United States Environmental Protection Agency (EPA) approved landfill. Contaminated debris occurred on Site as piping, brick and other construction materials painted with lead-based paint. Stockpiles of formerly excavated material primarily consisted of soil, although in some cases there was also demolition debris. Debris and stockpile materials were sampled to characterize the constituent (arsenic, lead, etc.) concentration. Depending on the concentration, they were either excavated and disposed of on Site in PAs within the GC Area, or transported off Site for disposal at an Ecology/EPA approved landfill.
- **Tree Root Zone Remediation:** The purpose of this remedial action was to preserve selected trees within the future GC footprint. This remedial action involved

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sampling soil within tree drip lines (e.g., the approximate horizontal distance of the outstretched limbs and roots) for arsenic and lead. In instances where the arsenic CL or lead SL were exceeded, one foot of soil was carefully removed within the drip line of the tree, soil samples were collected, and the excavation was immediately filled with clean topsoil. If confirmation sample results exceeded the applicable cleanup goals, additional rounds of excavation and confirmation sampling were conducted until the remediation goals were achieved.

- **Large-Scale Excavation:** Large-Scale Excavation involved excavation of one foot of soil over large areas of the Site where elevated levels of arsenic and lead were present. Following excavation, confirmation samples were collected to confirm that the applicable cleanup goals were met. Where goals were not achieved, additional excavation was conducted until goals were met. Excavated soil was disposed of on Site in PAs within the GC Area.
- **On-Site Deposition with a Cap/Cover (Golf Course):** The majority of contaminated soil excavated from the Site was deposited in PAs that were located within the GC footprint. The contaminated soil was then covered with a cap that consisted of at least 12 inches of compacted gravel that was then topped with a minimum of six inches of clean soil.
- **Cap/Cover of Historical Areas:** Contaminated soil in the HI Areas was covered with a cap that consisted of at least 12 inches of compacted gravel that was then topped with a minimum of six inches of clean soil. After the minimal cap thickness was met, where planting was specified, additional soil was added to the depth necessary to cover the root ball of the designated plant(s).

In 2016, Ecology conducted a review of post-cleanup conditions and monitoring data to ensure that human health and the environment are being protected at the former Weyerhaeuser Dupont Facility site. Cleanup at this Site was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC). This review concluded that:

- The cleanup actions completed at the Site appear to be protective of human health and the environment for current land use designations.
- Soil cleanup levels have not been met at the Site; however, under WAC 173-340-740(6) (d), the cleanup action could comply with cleanup standards if the long-term integrity of the containment system is ensured and the requirements for containment technologies in WAC 173-340-360 continue to be met.
- The results of last four rounds of groundwater monitoring conducted between 2011 through 2014 showed that 2,4-DNT was not detected and 2,6-DNT was

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detected below the decision criteria presented in the Closure Report. As a result, groundwater monitoring was discontinued in late 2014 and the groundwater monitoring is no longer required at this Site. However, the Restrictive Covenant restricts the groundwater use for drinking purposes since the laboratory practical quantitation limit for DNT is higher than the MTCA Method B cleanup level.

- The soil cleanup actions and the groundwater monitoring requirements have been met as required by the Consent Decree No. 03-2-10484-7 and the decision criteria are presented in the Closure Report.

Based on this review, Ecology determined that the remedial actions conducted at the Site continue to be protective of human health and the environment. The requirements of the covenant are being satisfactorily followed and no additional remedial actions are required.

Ecology determined that the Weyerhaeuser DuPont Site meets the requirements for removal from the Hazardous Sites List [WAC 173-340-330(7)], and proposed to remove the Site from the Hazardous Site List subsequent to, and after consideration of, public comment. This closure and delisting was completed in 2016, but left environmental covenants in place.

2.2 SUMMARY OF CLEANUP CRITERIA (ARARS)

Each potential media (soil, groundwater, surface water, sediment [lake]) is handled differently, and has different exposure assumptions and what are called "Applicable or relevant and appropriate requirements" (ARARs). ARARs are the rules, laws and standards that regulate cleanup criteria at hazardous waste sites (among other requirements), though for purposes of this discussion, "ARAR" is synonymous with cleanup levels. In the State of Washington, the Model Toxics Control Act is the primary ARAR that applies to this site.

Based on the latest data reports, there appears to be no reason that groundwater, surface water or sediment should be subject to any restrictions on use. In fact, based on the data presented in the 1994 Draft RI report, Ecology verbally agreed to No Further Action for surface water and sediment within Site (PERC 2007). Groundwater has achieved desired remediation specified in the risk assessment, and groundwater assessment and sampling is no longer required (Ecology 2016).

Since groundwater, sediment and surface water have been determined to be clean (Ecology 2016), only soil results are discussed in detail.

MTCA regulates soil for two primary exposure pathways that are relevant to this site. The first is the top 15 feet of soil that is considered viable for direct contact for human and ecological receptors, and the second is soil that potentially impacts groundwater by

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leaching contaminants into it. One major data gap that exists on this site is the relative lack of subsurface (> 3 feet) soil data. During large scale removal actions, the only confirmatory samples that were collected were at the base of the (shallow) excavation limits.

Following the removal actions, only three chemicals were identified in soil at levels greater than cleanup criteria. They included:

- Arsenic
- Lead
- Total Petroleum Hydrocarbons (heavy oil fraction)

Current cleanup standards for these chemicals for unrestricted use under MTCA method A for unrestricted use are as follows:

- Arsenic - 20 mg/kg
- Lead - 250 mg/kg
- Total Petroleum Hydrocarbons (heavy oil fraction) - 2000 mg/kg

Please note that mg/kg is the same as parts per million (ppm). Action levels (maximum allowable contamination levels targeted for removal) used during the site closure and specified in the Record of Decision for commercial use are 60 ppm for arsenic and 118 ppm for lead. Heavy oil used the specified 2000 ppm. No cleanup levels for unrestricted use were identified in the document. For petroleum, Stantec concurs that the 2000 ppm standard is appropriate.

For lead, the 118 ppm ecological screening level seems excessively conservative. The lead soil cleanup level protective of a daycare facility or school is 250 ppm. The surrounding area is not quality ecological habitat. The site is clear cut land surrounding a golf course.

The arsenic standard used is more complicated. To understand the appropriate use of the cleanup levels, as they are significantly above risk-based criteria, Stantec researched naturally occurring background data from studies performed in the 1990s.

Under MTCA, natural background can be used to establish final cleanup levels, if natural background is greater than risk-based cleanup levels and Practical Quantitation Limits (PQL). This is identified in WAC 173-340-700 (6) Requirements for setting cleanup levels (d) Natural background and analytical considerations. Essentially, even if current levels pose a risk, they are acceptable if they are naturally occurring.

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Arsenic background levels were determined by Hart Crowser in 1994, with concurrence documented by Ecology in a letter dated March 11, 1996 to Vern Moore of Weyerhaeuser from Mike Blum at Ecology. This letter states that Ecology Team concurs with the background level, and that "Ecology will not require cleanup soil standards to be more stringent than 32 ppm, irrespective of land use." This determined 32 ppm (mg/kg) as the site cleanup level for unrestricted (residential, with residential specified in the letter) use and further indicated 200 ppm for industrial use.

2.3 SUMMARY OF RESIDUALS IN-PLACE FOR EACH AREA

Project documents (PERC 2007) divided the site into multiple sub parcels based on former land use and cleanup activities. Attachment 1 details the borders of these sub parcels. Data presented in the project documents is likewise divided by area, and highly detailed maps of post-removal sampling locations are presented in the closure plan. These sub parcels are designated as follows:

- GC01-GC09—These parcels are now the golf course and contain capped material that was excavated from other portions of the site.
- Historical Areas— Four Historical (HI) Areas were identified at the Site, including the 1833 Fort Nisqually Site (Historical Site Number 45PI55), the Fort Nisqually Cemetery (Historical Site Number 45PI404), the Shell Midden, (Historical Site Number 45PI72), and an area where Native American graves were found (Historical Site Number 45PI712).
- IN-01—The industrial parcel north of Sequelitchew Creek.
- Old Fort Lake—The lake, surrounded by sub parcel OS04.
- OS01-OS04—These are designated open space parcels.
- CM01-CM09—The areas surrounding the golf course that were referred to as "commercial" parcels.

2.4 "NO-ACTION" RECOMMENDED AREAS

No development or land disturbance is recommended in the golf course and historical areas. The golf course likely contains significant contamination (material was placed here and capped specifically), and the historical areas are culturally significant and must remain undisturbed by law. We did not further analyze data from these areas, and no land use changes are recommended.

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2.5 “NO-DATA” AREA

Sub parcel IN01 has been reworked and excavated over the years (mineral resources) and existing data is no longer valid. This area would need to be investigated further if land use changes were desired.

2.6 RECREATIONAL/OPEN SPACE AREAS

The following areas are currently designated open space. Changing the land use in the comprehensive plan updates is not recommended based on critical areas associated with each area. Development of recreational amenities such as trails or fishing facilities could potentially be accomplished and should be discussed with Ecology.

2.7 OLD FORT LAKE

Old Fort Lake sediments and surface water (Ecology 2016) have been determined through data collected over the years to be un-impacted by contamination. A strong case for lifting recreational use restrictions could be made for the lake without further sampling and analysis. A few locations containing contamination greater than ARARs remain post removal (6 for arsenic and 2 for lead, out of literally hundreds of samples), with only 1 location grossly exceeding the cleanup criteria. As open space/recreational use, levels may not need to meet the much more stringent unrestricted use ARARs. This would be subject to negotiation with Ecology. Specific data for each OS area is described below.

One potential data gap could include deeper sediments (e.g. 0.5-2 feet), although the WAC 1730204-200 Sediment Management Standards define the upper 10 centimeters as the biologically active zone for most species. It is possible that former industrial processes had impacts that were later buried by subsequent sediment and have not been evaluated, however there is no particular reason to believe this is true.

2.8 OPEN SPACE PARCELS

Data from sub parcel OS01 was assessed using sample data from the Closure Report. Post removal, no data indicated any cleanup was required, and samples contained a maximum concentration of lead at 109 ppm and of arsenic at 28.2 ppm left in place. Sampling locations in this area are shown in Attachment 2. Locations exceeding criteria are highlighted in red.

Data from sub parcel OS02 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 88 ppm, and all samples below criteria. Two locations contained arsenic above specified cleanup criteria. Location MSU-100-N contained 50.3 ppm and location MSU-9-N contained 41.9

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ppm arsenic. Sampling locations in this area are shown in Attachment 3. Locations exceeding criteria are highlighted in red.

Data from sub parcel OS03 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of arsenic at 30.9 ppm, and all samples below criteria. Four locations contained lead above specified cleanup criteria at one apparently left-in-place hot spot. Grid node LR-68 contained 4 sampling locations with concentrations of lead ranging from 142-3460 ppm. Only locations LR-68-A-VS-B (3460 ppm) at 2-2.5 feet bgs and LR-68-B-VS-B at 2-2.5 feet bgs (368) exceeded the 250 ppm standard. The City might consider evaluation of the lead hot spot and potentially removing soil to obtain an unrestricted use standard for this sub parcel. Sampling locations in this area are shown in Attachment 3. Locations exceeding criteria are highlighted in red.

OS04 surrounds Old Fort Lake and is adjacent to four golf course parcels. The edges of this parcel should not be disturbed as they could compromise the caps present at GC04, GC05, GC06 and CG08. Data from sub parcel OS04 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 101 ppm, and all samples were below cleanup criteria. Four locations contained arsenic above specified cleanup criteria. Lead at location 18R-454 was detected at 42 ppm. Lead at location LR-143 was detected at 36 ppm. Lead at location LR 197 was detected at 35 ppm and lead at location LR-214 was detected at 59 ppm arsenic. Sampling locations in this area are shown in Attachment 4. Locations exceeding criteria are highlighted in red.

2.9 DATA GAP SUMMARY FOR OPEN SPACE PARCELS

The approach to lift restrictive covenants for recreational use of these areas should include evaluation and possible removal of the one lead hot spot in parcel OS03 and negotiation of a usable recreational standard for arsenic of at least 60 ppm. If these things can be achieved, a land use change to recreational use is likely, with restrictions left in place for digging/excavation along the edges of golf course parcels.

2.10 POTENTIAL DEVELOPMENT AREAS

The City desires to evaluate the current restrictive covenants on the designated commercial areas to determine if unrestricted uses could be zoned into their comprehensive plan update in the future. The areas to be evaluated (see Attachment 1) include the "CM" designated areas. Except as noted, no organic compounds noted as potentially of concern were detected following the removal actions. All comparisons provided below are based on unrestricted use criteria, not the commercial or industrial values.

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Currently, the area is zoned for commercial or industrial land use. Following the removal actions, gridded sample locations were tested to evaluate residual contamination. In most cases, if a location was found to contain levels of contaminants in excess of ARARs, further excavation and removal was performed. The post-removal locations where contaminant levels exceed unrestricted use criteria are identified in Table 1 and Attachments 2-12.

Data from sub parcel CM01A was assessed using sample data from the Closure Report. Post removal, samples in the first 15 feet sampled contained a maximum concentration of lead at 117 ppm, and all samples below criteria. Three locations contained arsenic above specified cleanup criteria. Location R12-C36 contained 56.6 ppm from 1-1.5 feet bgs, location R19-C40 contained 43.9 ppm from 1-1.5 feet bgs, and location SA1-30-51 contained 37 ppm arsenic at 3-3.5 bgs. Deep samples (15+ feet) contained ARAR exceedences for lead at location 5-MSU-D-4 (554 ppm at 15.5 feet bgs) and heavy oil at locations 8-TPS-04-S1 and 8-TPS-04-S2 (3000 and 2100 ppm at 15-17 feet bgs). Sampling locations in this area are shown in Attachment 5. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM01B was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 98 ppm, and all samples below criteria. Six locations contained arsenic above specified cleanup criteria. Locations NGRR-308 and 309 contained 34 ppm from 1-1.5 feet bgs, location NGRR-89 contained 37 ppm from 1-1.5 feet bgs, location R28C26 contained 49.9 ppm from 1-1.5 feet bgs, location R28C27 contained 44.3ppm from 1-1.5 feet bgs and location R28C28 contained 47 ppm from 1-1.5 feet bgs. Sampling locations in this area are shown in Attachment 6. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM02A was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 110 ppm, and all samples below criteria. Five locations contained arsenic above specified cleanup criteria. Locations MSU-76-E and SA6-70-31 contained 37 ppm from 0-0.5 and 1-1.5 feet bgs, location LR-059-S-2 contained 39 ppm from 0-0.5 feet bgs, location R50-C22 contained 40.9 ppm from 1-1.5 feet bgs, and location SA6-71-28 contained 39 ppm from 1-1.5 feet bgs. Sampling locations in this area are shown in Attachment 7. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM02B was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 91.9 ppm, and all samples below criteria. Six locations contained arsenic above specified cleanup criteria. Location LR-208 contained 39 ppm from 0-0.5 feet bgs, locations NGRR-214, 215 and 218 contained 38, 55 and 50 ppm from 1.5-2 feet bgs, location R51-C7 contained 32.4 ppm from 1-1.5 feet bgs, and location R57-C20 contained 42.1 ppm from 1-1.5 feet

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bgs. Sampling locations in this area are shown in Attachment 8. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM03 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 86 ppm, and all samples below criteria. Ten locations contained arsenic above specified cleanup criteria. Locations LR226, LR227 and LR254 contained 37, 38 and 40 ppm from 0-0.5 feet bgs, location R35-C15-TS04 contained 33 ppm from 1.5-2 feet bgs, and locations R66-C28, R71-C19, R75-C24, R75-C35, R78-C30 and R83-C40 contained 49.6, 40.5, 59.9, 55, 39.6 and 34.8 ppm from 1-1.5 feet bgs. Sampling locations in this area are shown in Attachment 9. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM04 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 117 ppm, and all samples below criteria. Eighteen locations contained arsenic above specified cleanup criteria. Locations Buff-16, Buff-20, Buff-22, Buff-24, Buff-26, Buff-27, Buff-28, Buff-30 and Buff-32 contained 54.2, 35.9, 54.7, 32.1, 35.3, 43.9, 56.1, 47.4, and 48 ppm from 1-1.5 feet bgs, and as they are located in close proximity, may indeed represent an elevated arsenic source area. The remaining locations contained sporadic, near background concentrations similar to the other CM areas and included locations R53-C62, R60-C65, R60-C77, R60-C78, R62-C63, R81-C69, R85-C55 and R85-C60 containing 44.3, 37.4, 32.8, 32.9, 36.6, 34.1, 53.4 and 37.2 ppm from 1-1.5 feet bgs. Location NGRR-113 contained 55 ppm from 1.5-2 feet bgs. Sampling locations in this area are shown in Attachment 10. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM05 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 110 ppm, and all samples below criteria. Seven locations contained arsenic above specified cleanup criteria. Locations F167 and F322 contained 60 and 53 ppm from 2-2.5 feet bgs, location NGRR-430 contained 35 ppm from 1.5-2 feet bgs, and locations R33-C49, R35-C48, R44-C59 and R52-C61 contained 36.6, 47.6, 35 and 35.2 ppm from 1-1.5 feet bgs. Sampling locations in this area are shown in Attachment 11. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM06 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 69 ppm, and all samples below criteria. Two locations contained arsenic above specified cleanup criteria. Locations F217 and NGRR-187 contained 33 and 37.5 ppm from 2-2.5 and 1.5-2 feet bgs. Sampling locations in this area are shown in Attachment 12. Locations exceeding criteria are highlighted in red.

Data from sub parcel CM07 was assessed using sample data from the Closure Report. Post removal, samples contained a maximum concentration of lead at 118 ppm, and

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all samples below criteria. Eleven locations contained arsenic above specified cleanup criteria. Locations Buff-01, Buff-05, Buff-07, Buff-11, Buff-13, and Buff-14 contained 36.7, 37.6, 46.8, 56.3, 54.5 and 34.8 ppm from 1-1.5 feet bgs, and as they are in close proximity, may represent an elevated arsenic source area. Likewise, locations R49-C80, R50-C76, and R51-C76 may be a source area, containing concentrations of 41, 53.5 and 32.5 from 2-1-1.5 feet bgs, as well as having adjacent locations at or near the background value of 32 ppm. The remaining two locations contained sporadic concentrations and included locations MSU-F-54-2 and LR181-VS-9 containing 33.5 and 54 ppm from 0-1.5 and 2-2.5 feet bgs. Sampling locations in this area are shown in Attachment 13. Locations exceeding criteria are highlighted in red.

Sub parcel CM-08 is definitely impacted by residual contamination, and approximately half of the sample locations contain arsenic above cleanup levels for unrestricted use. Detailed analysis of locations of arsenic exceeding ARARs is not included in Table 1. Grid node R62-C74 and its surrounding area contained 110 ppm arsenic. The highest lead detections (130 ppm at node R61-C73) seem to coincide with elevated arsenic, leading to a conclusion that they are related. Obtaining unrestricted use for this parcel would be difficult or impossible. Some us, perhaps an open space or trail, could potentially be negotiated. Sampling locations in this area are shown in Attachment 14. Locations exceeding criteria are highlighted in red.

2.11 DATA GAP SUMMARY FOR OPEN SPACE PARCELS

The primary data gap for the commercially-zoned areas is the lack of subsurface data. Since MTCA requires demonstration of compliance with ARARs to a depth of 15 feet to ensure unrestricted use, the conclusion that these areas are safe to allow such use is not demonstrated.

Further, several specific "hot spots" (see Table 1) could be further delineated so that they could be "cordoned off" and removed as sub-parcels that retained a restrictive covenant rather than prohibiting unrestricted use over the entirety of a sub parcel. This would allow the covenant to remain in association with areas exceeding ARARs, while allowing unrestricted development over the remainder of the property.

2.12 PATH FORWARD

The Record of Decision (ROD), Consent Decree and Restrictive Covenants specify that no excavation or drilling may occur without prior notification and approval of Ecology for parcels with restrictive covenants. The process for this notification and approval are detailed in the ROD and the 2016 five-year review

Subsurface data and hot-spot delineation should be performed to fully define and map the areas containing residual contamination associated with post removal soils. The

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scope of this work would have to be negotiated between the property owner and Ecology; however, it is likely that such negotiation would be successful. If the identified data gaps were filled, the bulk of the commercial properties would likely be available for rezoning by the City to include uses such as residential.

Further, the cleanup criteria for lead should be discussed with Ecology to change the restricted-use criteria to 250 ppm. Discussion about many of the at-or-near-background samples (e.g. when a location has 32.2 ppm) that are essentially "at" background and not likely actionable, should be discussed with Ecology to limit the scope of additional investigation.

In summary, we believe that the City should agree to the following criteria to determine unrestricted use, and should negotiate any changes in land use restrictions based on the following:

- Heavy Oil—2000 ppm
- Lead—250 ppm
- Arsenic—32 ppm

Since non-soil media are all currently listed as No Further Action, the City and property owner should ask for removal of any and all restrictions on redevelopment of the open space areas for recreational use, and the comprehensive plan update and Parks department at the City should restrict these areas as appropriate for open space under City and County Code documents rather than a Consent Decree under MTCA. Stantec would work with the City to achieve this outcome.

2.13 REFERENCES

Ecology 2016, Washington State Department of Ecology, Final Periodic Review Report, July 2016

PERC 2007, Pacific Environmental and Redevelopment Corporation (PERC), Final Closure Report, Former DuPont Works Site, March 2007

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Table 1. Residual Contamination for Commercial Area Sub Parcels Exceeding ARARs

Sub Parcel	Location	Contaminant	Concentration (ppm)	Depth Range
OS02	MSU-100-N	Arsenic	41.9	1-1.5
OS03	LR-68			
	LR-68-A-VS-B	Lead	3460	2-2.5
	LR-68-B-VS-B	Lead	368	2-2.5
OS04	18R-454	Arsenic	42	1-1.5
	LR-143	Arsenic	36	1-1.5
	LR-197	Arsenic	35	1-1.5
	LR-214	Arsenic	59	1-1.5
CM-01A	R12-C36	Arsenic	56.6	1-1.5
	R19-C40	Arsenic	43.9	1-1.5
	SA1-30-51	Arsenic	37	3-3.5
	5-MSU-D-4	Lead	554	15.5-16
	8-TPS-04-S1	Heavy Oil	3000	15-17
	8-TPS-04-S2	Heavy Oil	2100	15-17
CM-01B	NGRR-308	Arsenic	34	1-1.5
	NGRR-309	Arsenic	34	1-1.5
	NGRR-89	Arsenic	37	1-1.5
	R28-C26	Arsenic	49.9	1-1.5
	R28-C27	Arsenic	44.3	1-1.5
	R28-C28	Arsenic	47	1-1.5
CM-02A	MSU-76-E	Arsenic	37	0-0.5
	SA6-70-31	Arsenic	37	1-1.5
	LR-059-S-2	Arsenic	39	0-0.5
	R50-C22	Arsenic	40.9	1-1.5
	SA6-71-28	Arsenic	39	1-1.5
CM-02B	LR-208	Arsenic	39	0-0.5
	NGRR-214	Arsenic	38	1.5-2
	NGRR-215	Arsenic	55	1.5-2
	NGRR-218	Arsenic	50	1.5-2
	R51-C7	Arsenic	32.4	1-1.5
	R57-C20	Arsenic	42.1	1-1.5

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Table 1. Continued

Sub Parcel	Location	Contaminant	Concentration (ppm)	Depth Range
CM-03	LR226	Arsenic	37	0-0.5
	LR227	Arsenic	38	0-0.5
	LR254	Arsenic	40	0-0.5
	R35-C15-TS04	Arsenic	33	1.5-2
	R66-C28	Arsenic	49.6	1-1.5
	R71-C19	Arsenic	40.5	1-1.5
	R75-C24	Arsenic	59.9	1-1.5
	R75-C35	Arsenic	55	1-1.5
	R78-C30	Arsenic	39.6	1-1.5
	R83-C40	Arsenic	34.8	1-1.5
CM-04	Buff-16	Arsenic	54.2	1-1.5
	Buff-20	Arsenic	35.9	1-1.5
	Buff-22	Arsenic	54.7	1-1.5
	Buff-24	Arsenic	32.1	1-1.5
	Buff-26	Arsenic	35.3	1-1.5
	Buff-27	Arsenic	43.9	1-1.5
	Buff-28	Arsenic	56.1	1-1.5
	Buff-30	Arsenic	47.4	1-1.5
	Buff-32	Arsenic	48	1-1.5
	R53-C62	Arsenic	44.3	1-1.5
	R60-C65	Arsenic	37.4	1-1.5
	R60-C77	Arsenic	32.8	1-1.5
	R60-C78	Arsenic	32.9	1-1.5
	R62-C63	Arsenic	36.6	1-1.5
	R81-C69	Arsenic	34.1	1-1.5
	R85-C55	Arsenic	53.4	1-1.5
	R85-C60	Arsenic	37.2	1-1.5
	NGRR-113	Arsenic	55	1.5-2
CM-05	F167	Arsenic	60	2-2.5
	F322	Arsenic	53	2-2.5
	NGRR-430	Arsenic	35	1.5-2
	R33-C49	Arsenic	36.6	1-1.5
	R35-C48	Arsenic	47.6	1-1.5
	R44-C59	Arsenic	35	1-1.5
	R52-C61	Arsenic	35.2	1-1.5
CM-06	F217	Arsenic	33	2-2.5
	NGRR-187	Arsenic	37.5	1.5-2

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Table 1. Continued

Sub Parcel	Location	Contaminant	Concentration (ppm)	Depth Range
CM-07	Buff-01	Arsenic	36.7	1.5-2
	Buff-05	Arsenic	37.6	1.5-2
	Buff-07	Arsenic	46.8	1.5-2
	Buff-11	Arsenic	56.3	1.5-2
	Buff-13	Arsenic	54.2	1.5-2
	Buff-14	Arsenic	34.8	1.5-2
	R49-C80	Arsenic	41	1-1.5
	R50-C76	Arsenic	53.5	1-1.5
	R51-C76	Arsenic	32.5	1-1.5
	MSU-F-54-2	Arsenic	33.5	1-1.5
	LR181-VS-9	Arsenic	54	2-2.5

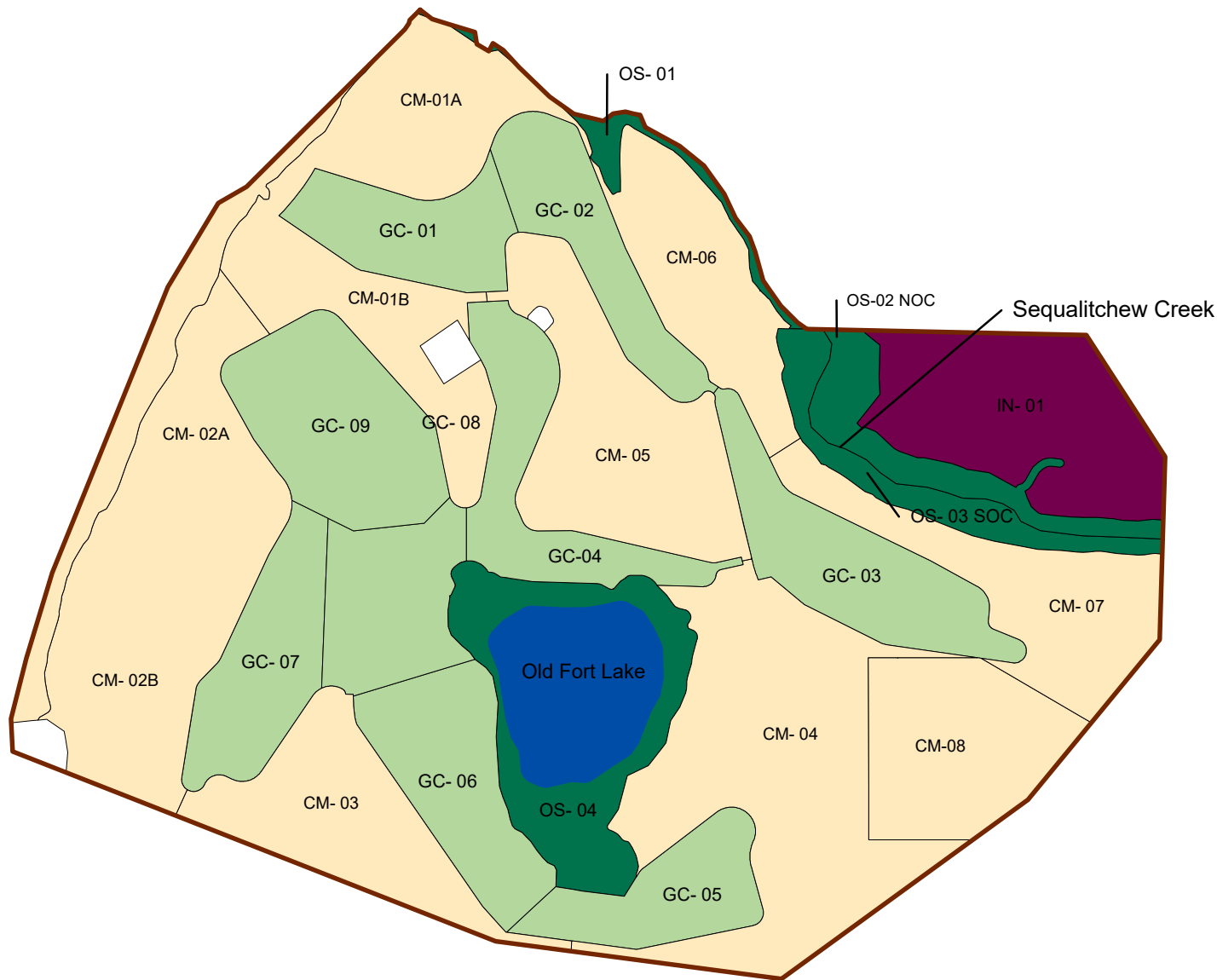
**LAND USE ASSESSMENT
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ATTACHMENTS



Legend

- Parcel One
- Commercial
- Golf Course
- Industrial
- Open Space
- Old Fort Lake

Notes

CM = Commercial
 GC = Golf Course
 IN = Industrial
 NOC = North of Creek
 SOC = South of Creek

Historical areas are not large scale remediation units. They are Miscellaneous Small Units.

Large Scale Remediation Units

Former DuPont Works Site
 January 2003

Figure 6-1

0 125 250 500 750 1,000 Feet



R0C35

R0C36

R10C41

MSU-104-N

MSU-104-NE

MSU-104-E

MSU-104-VS-B

MSU-104-W

MSU-106-N

MSU-104-S

MSU-106-W

MSU-106-VS-B

MSU-106-S

MSU-106-E

MSU-105-NE

MSU-105-VS-B

MSU-105-E

MSU-105-S

MSU-105-N

MSU-105-W

LR-013

R22C51

R22C52

MSU-NGRR-04

NGRR-179

Legend

- Sample Locations
- ▭ Consent Decree Boundary
- ▭ Golf Course Placement Area
- Remediation Units**
- ▭ Open Space 02
- ▭ Open Space 03

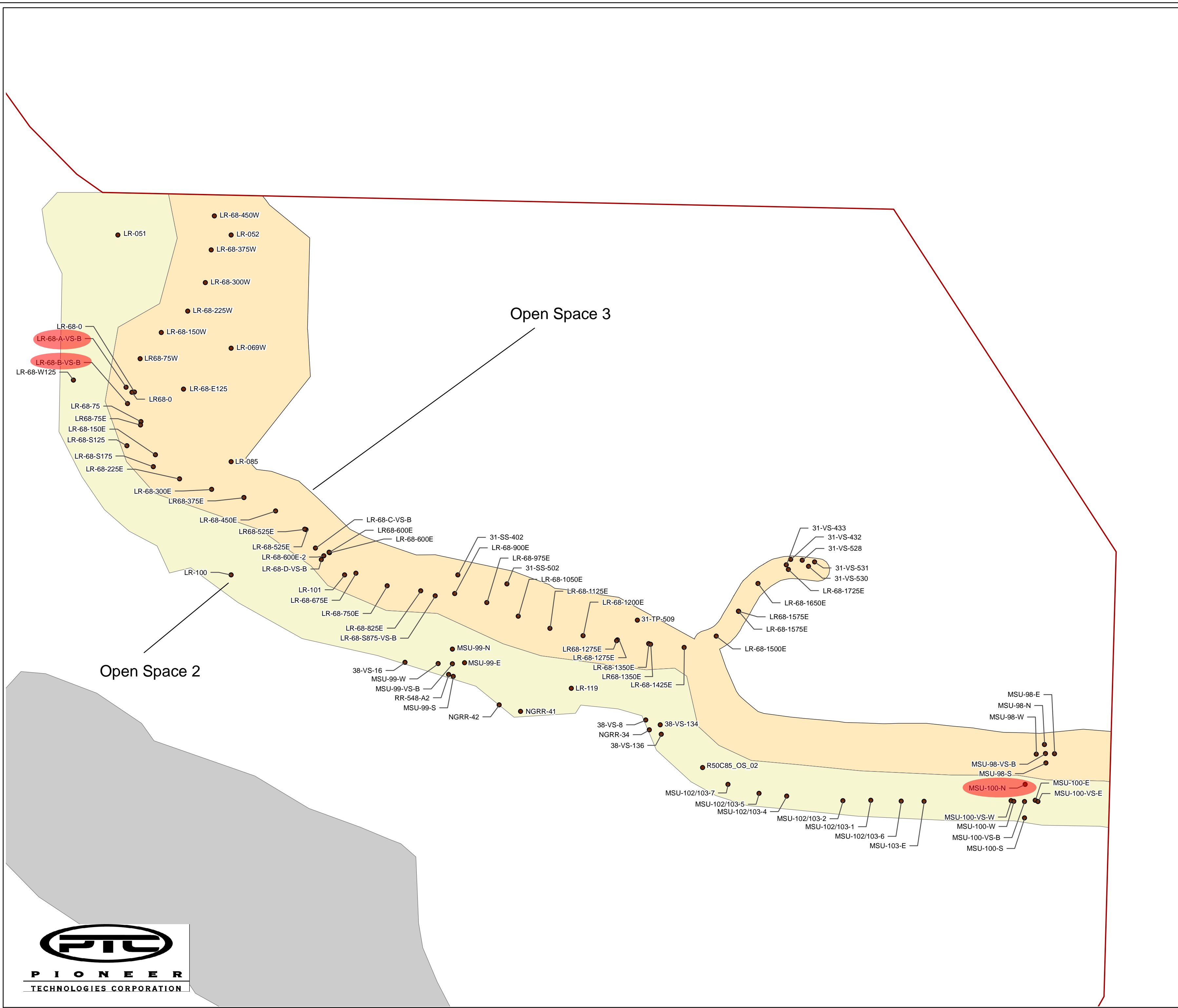
● Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



0 75 150 300 Feet

**Remediation Unit
Open Space 2 and 3**
Former DuPont Works Site
March 2007

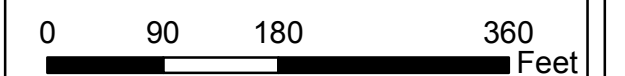
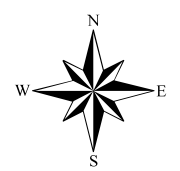
Figure B-21



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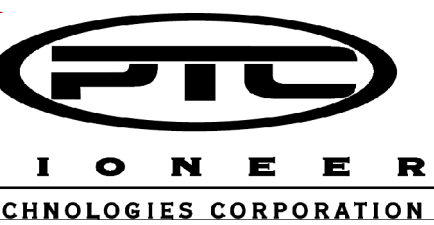
- Sample Locations
- Consent Decree Boundary
- Remediation Unit
- Golf Course Placement Area

● Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.

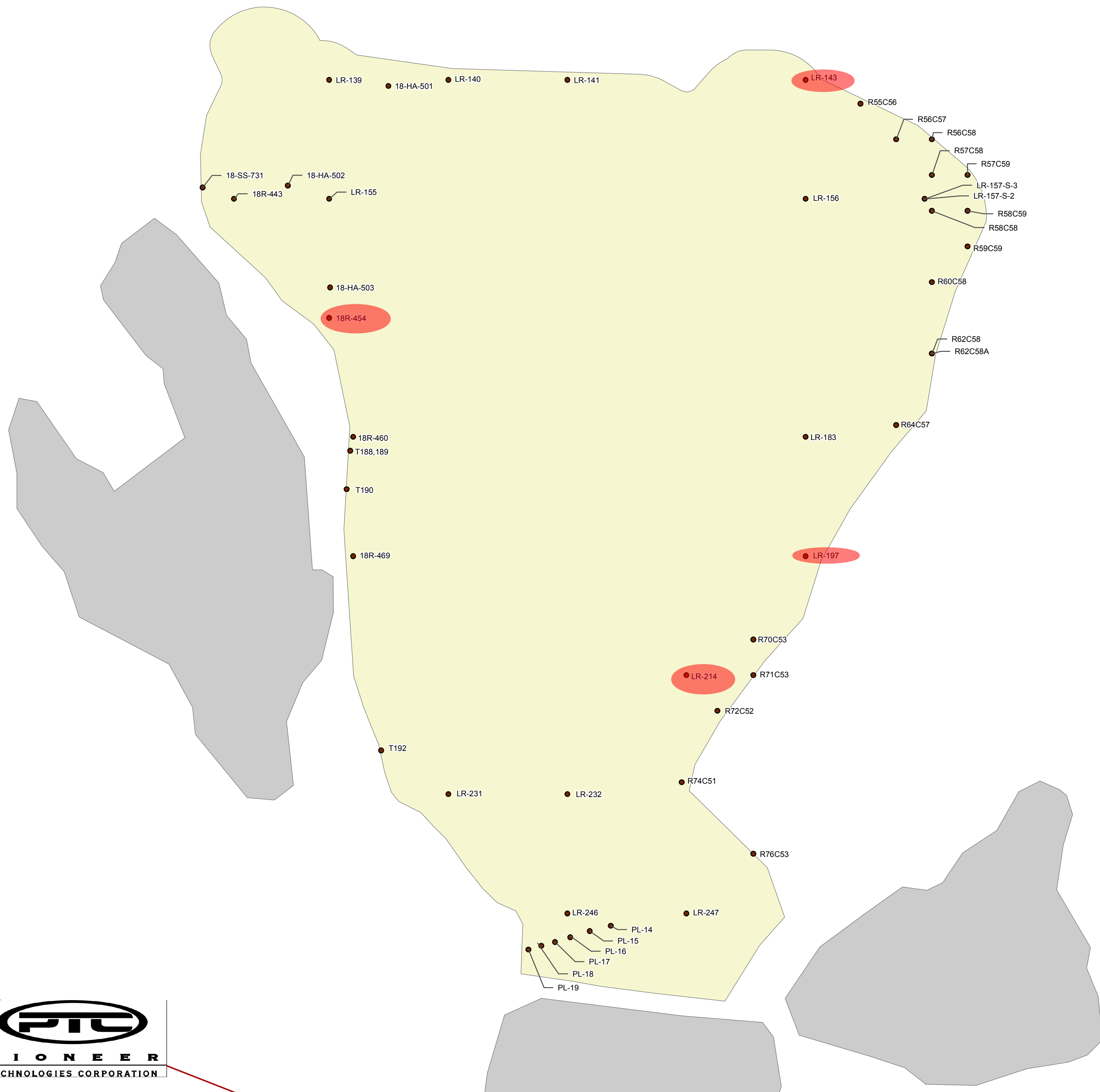


**Remediation Unit
Open Space 4**
Former DuPont Works Site
March 2007

Figure B-22



PIONEER
TECHNOLOGIES CORPORATION



Legend

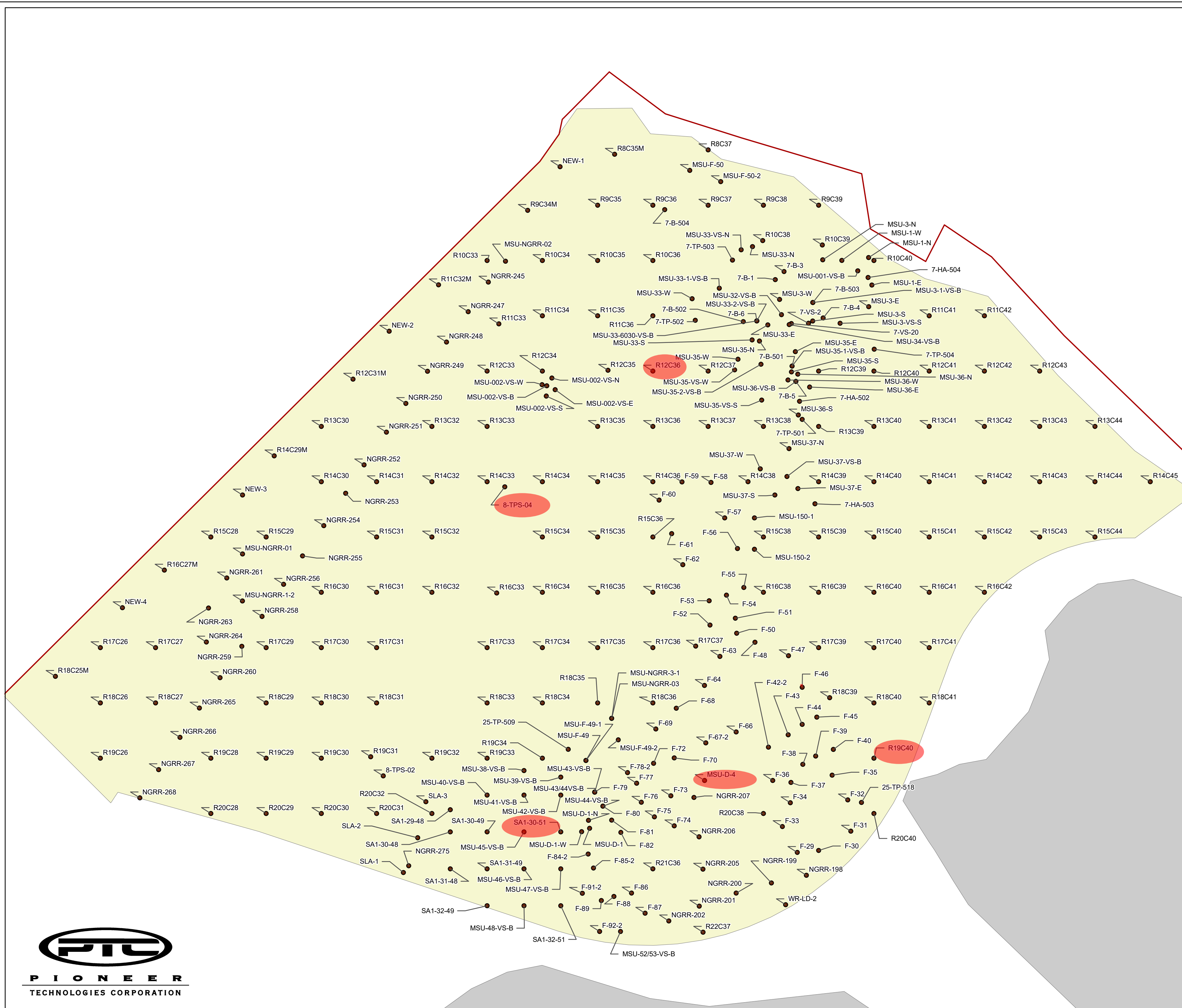
- Sample Locations
- Consent Decree Boundary
- Golf Course Placement Area
- Remediation Unit

● Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



**Remediation Unit
Commercial 1A**
Former DuPont Works Site
March 2007

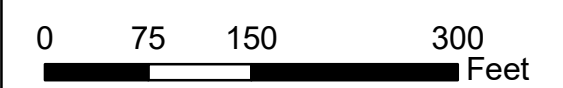
Figure B-1A



Legend

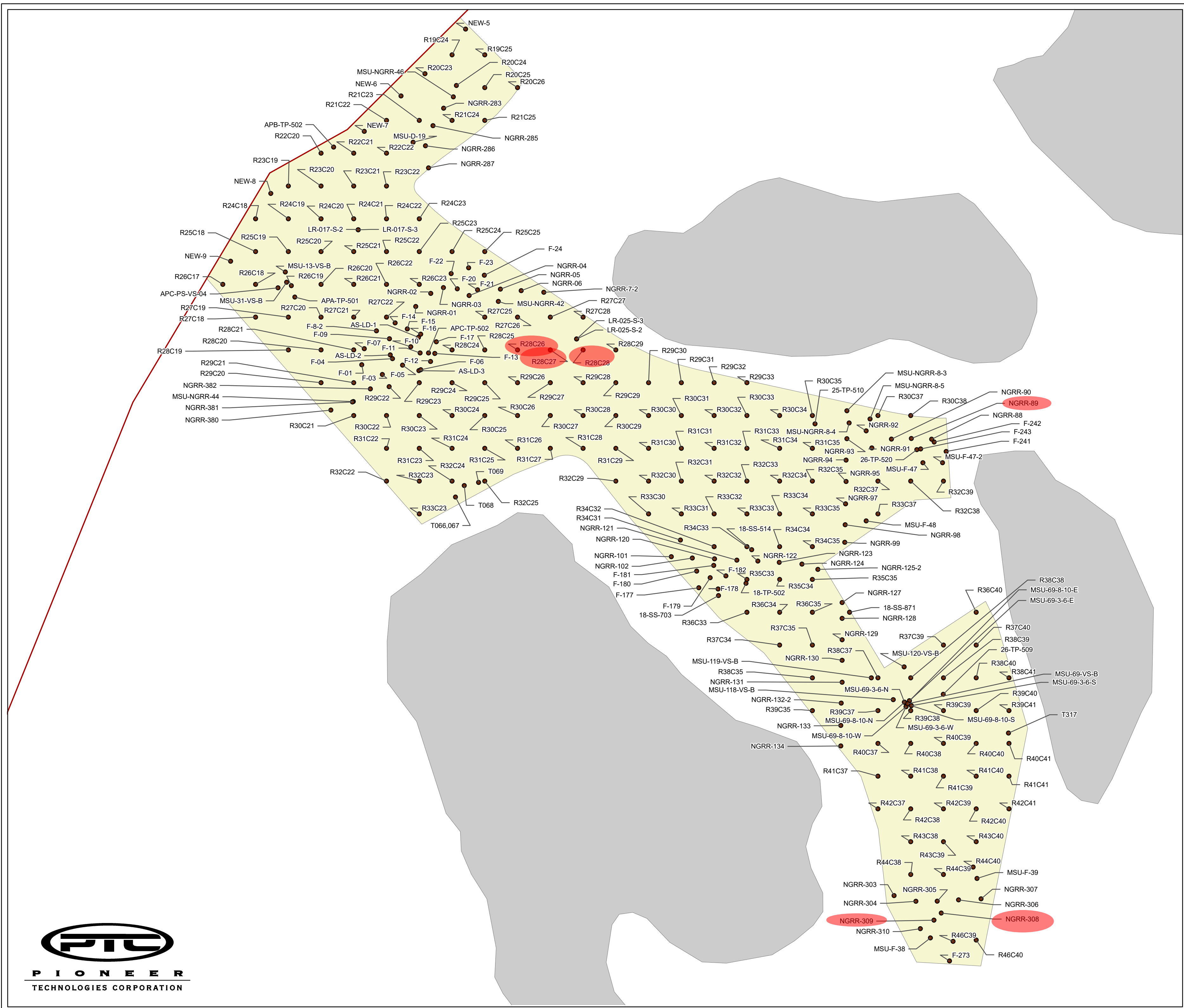
- Sample Locations
- Consent Decree Boundary
- Remediation Unit
- Golf Course Placement Area

● Locations where contaminant concentrations exceed background and MTC A Method A for unrestricted use.



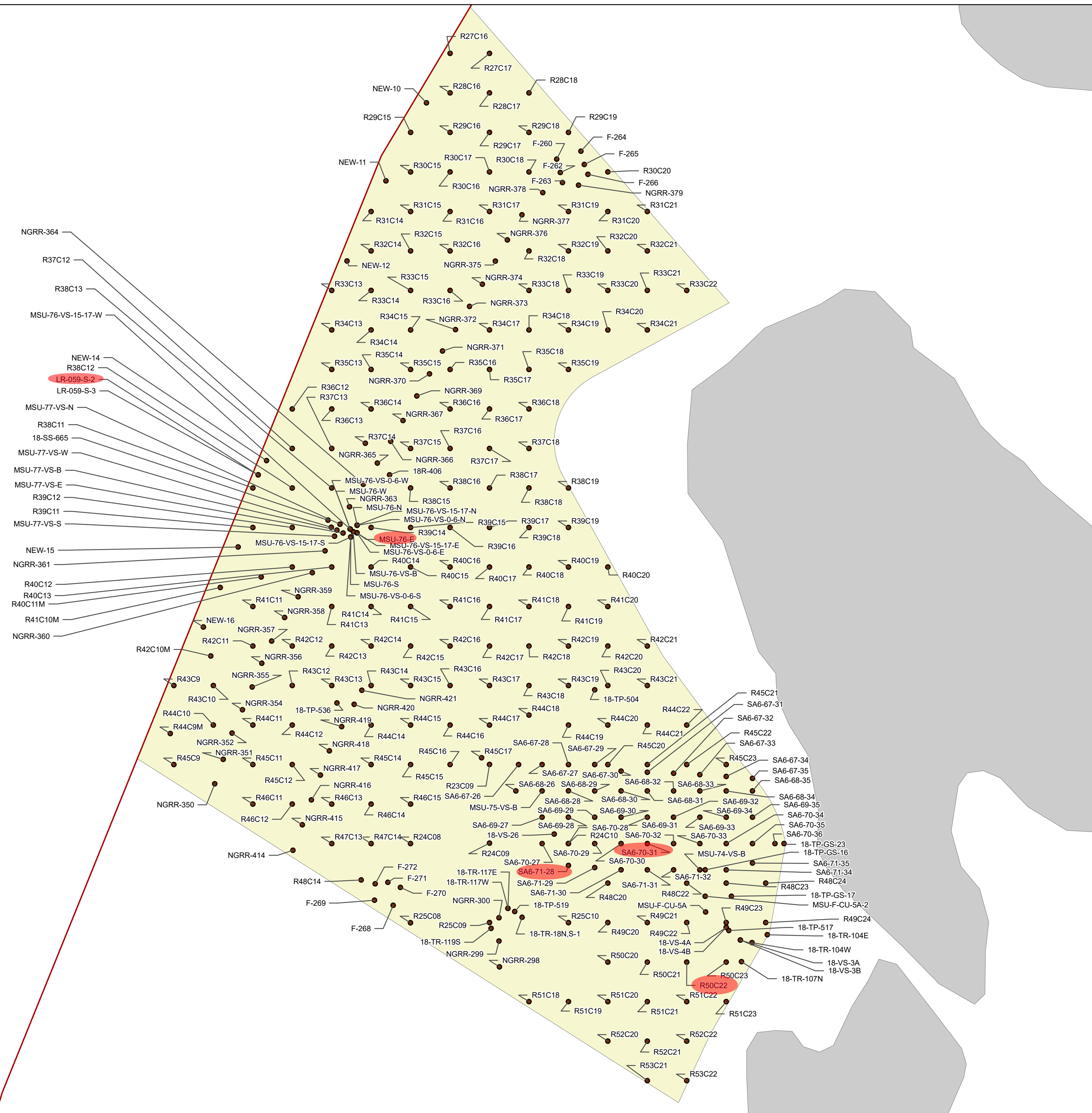
Remediation Unit Commercial 1B
Former DuPont Works Site
March 2007

Figure B-1B

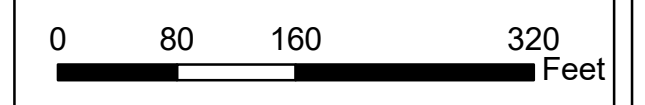


Legend

- Sample Locations
- Consent Decree Boundary
- Golf Course Placement Area
- Remediation Unit



● Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.

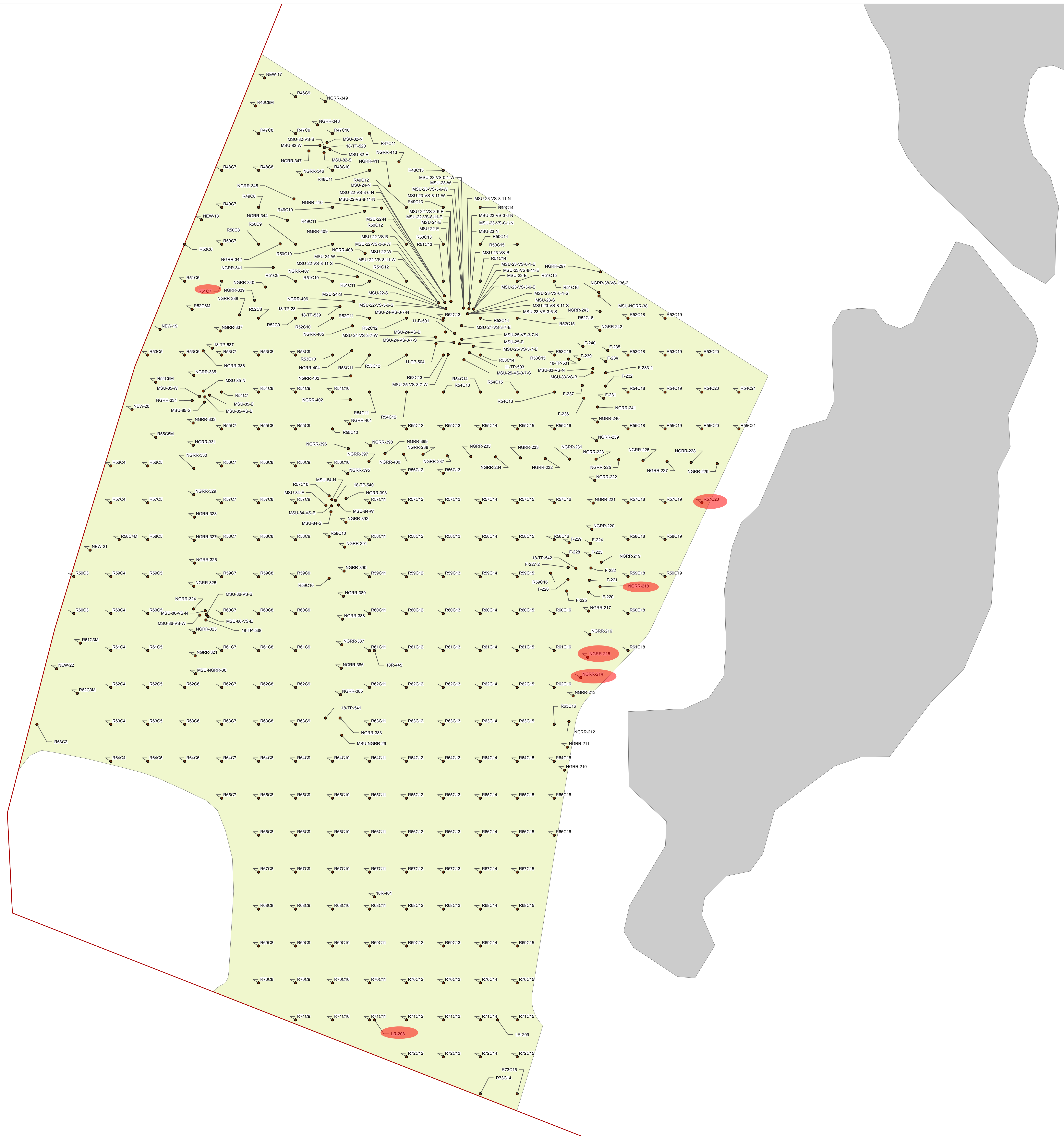


**Remediation Unit
Commercial 2A**
Former DuPont Works Site
March 2007

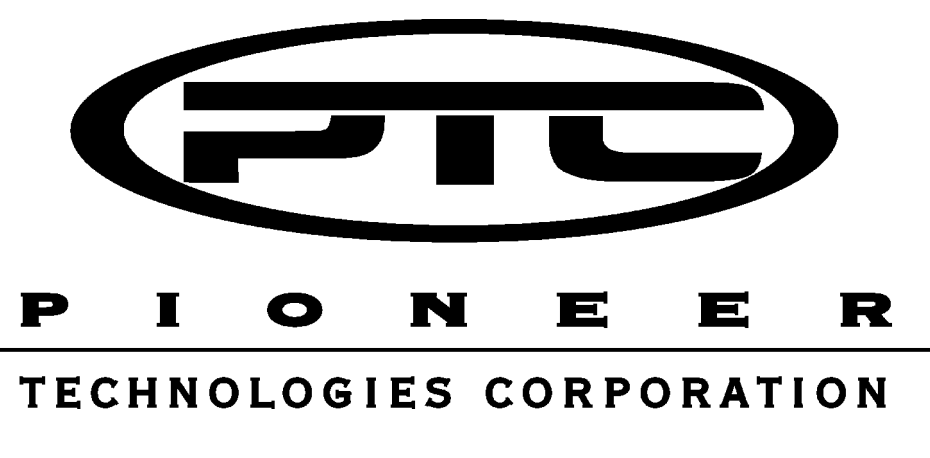
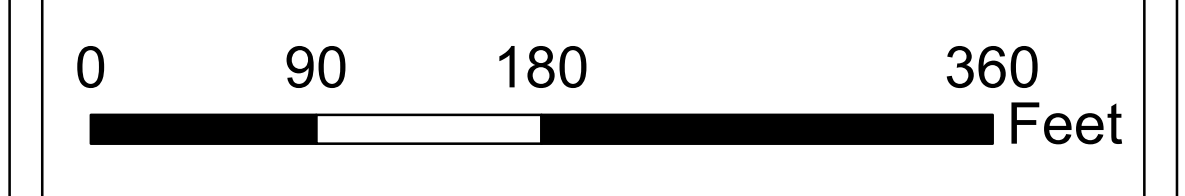
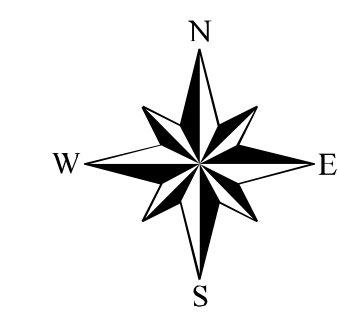
Figure B-2A

Legend

- Sample Locations
- Consent Decree Boundary
- Golf Course Placement Area
- Remediation Unit



Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



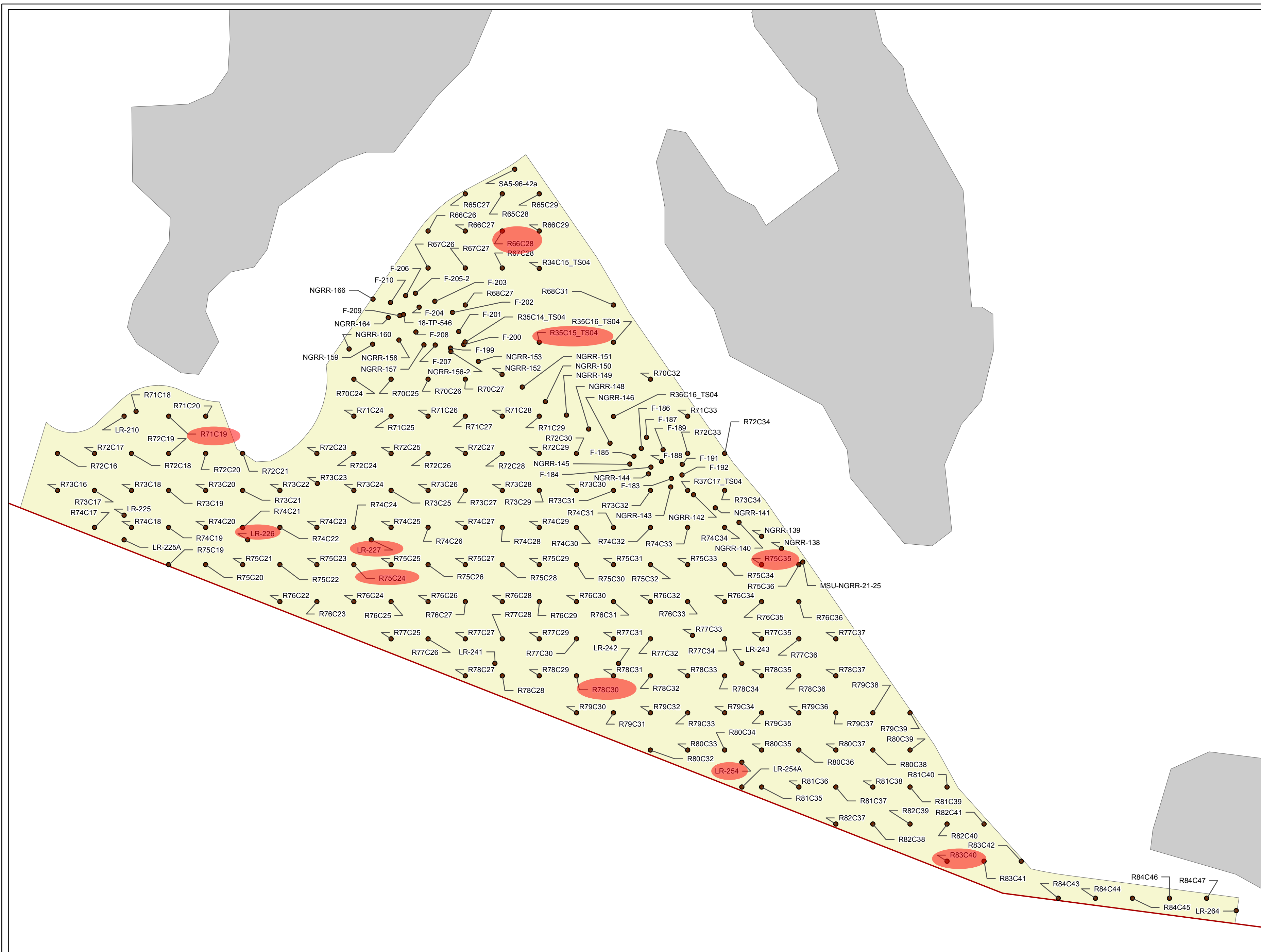
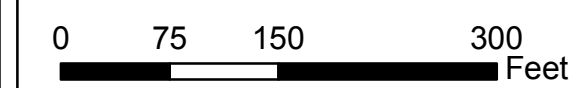
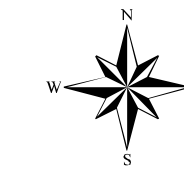
**Remediation Unit
Commercial 2B**
Former DuPont Works Site
March 2007

Figure B-2B

Legend

- Sample Locations
- Consent Decree Boundary
- Remediation Units
- Golf Course Placement Area

○ Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



Remediation Unit Commercial 3
 Former DuPont Works Site
 March 2007
Figure B-3

Legend

- Sample Locations
- ▭ Consent Decree Boundary
- ▭ Remediation Unit
- ▭ Golf Course Placement Area

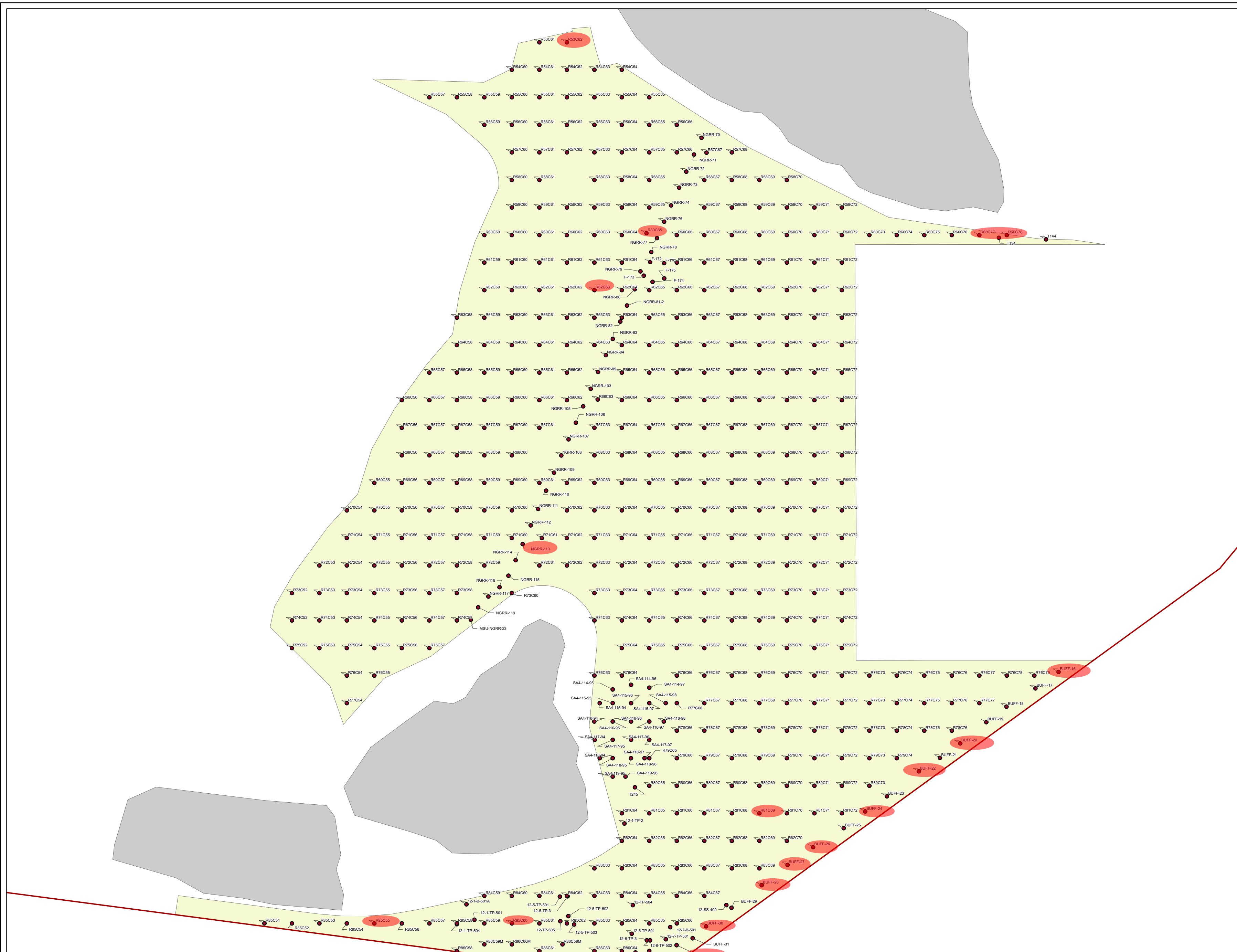
Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.

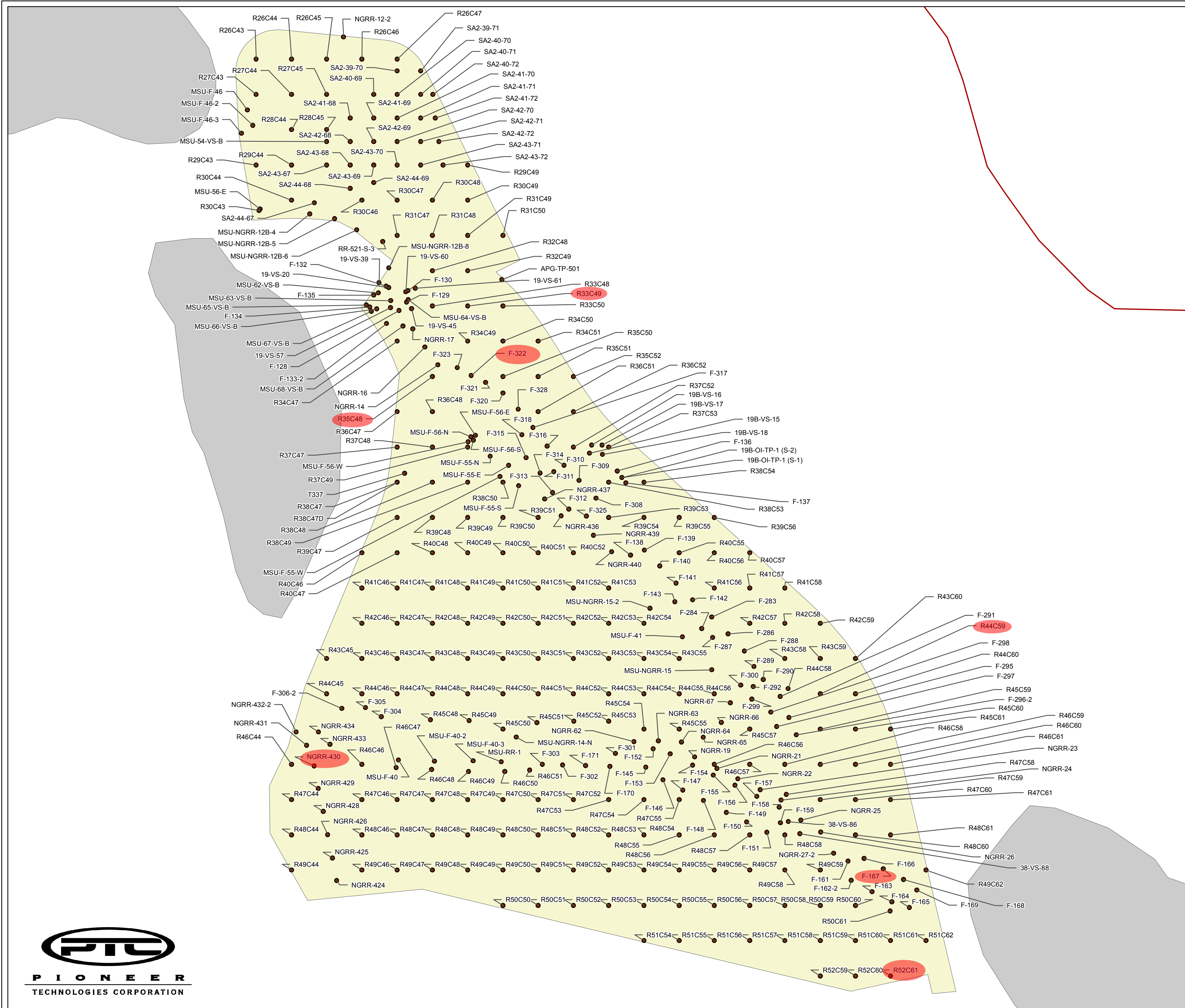


0 100 200 400 Feet

**Remediation Unit
Commercial 4**
Former DuPont Works Site
March 2007

Figure B-4

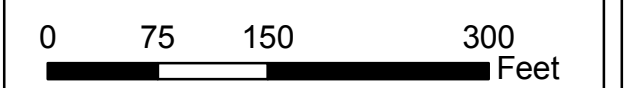




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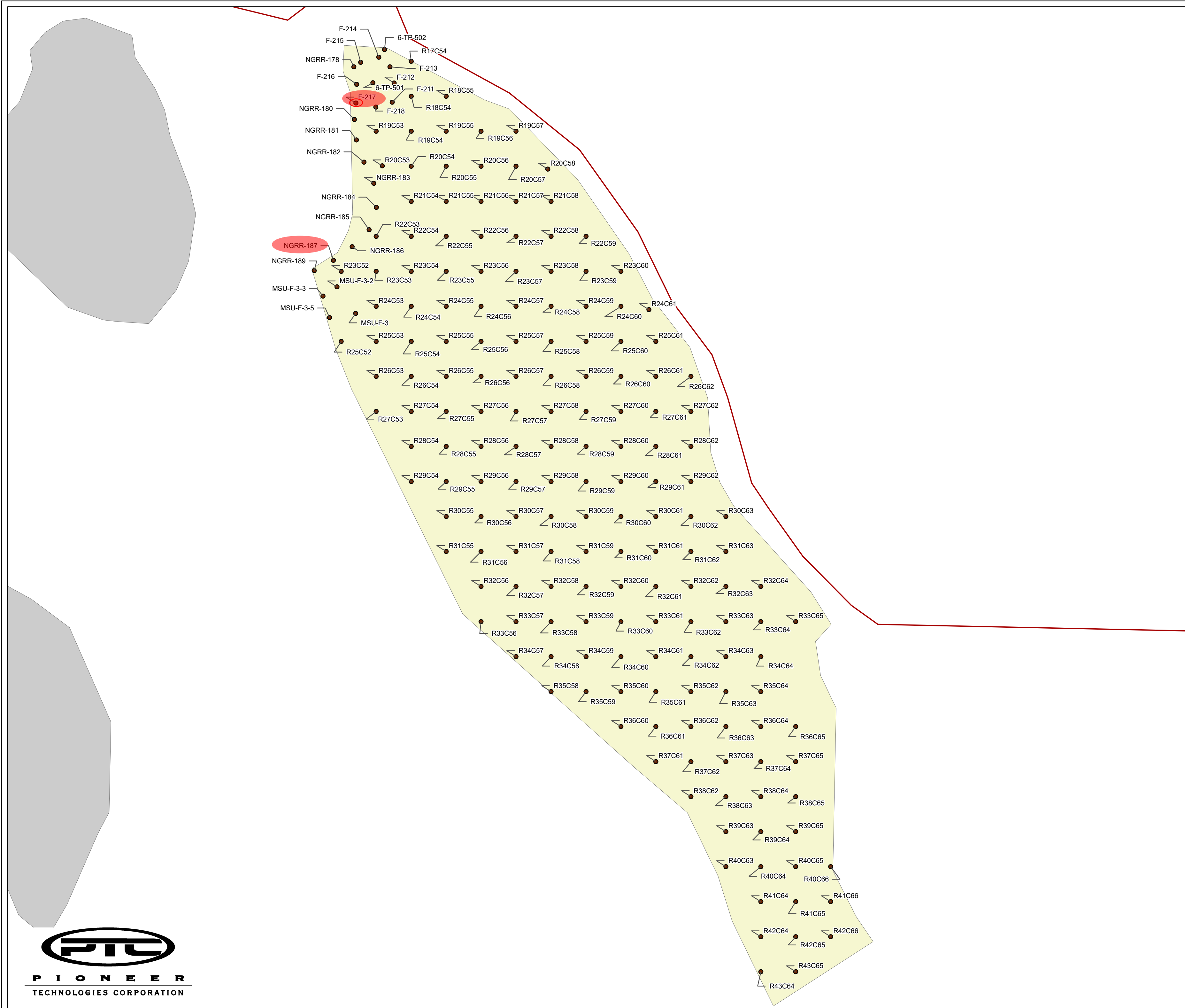
- Sample Locations
- Consent Decree Boundary
- Remediation Unit
- Golf Course Placement Area

● Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



**Remediation Unit
Commercial 5**
Former DuPont Works Site
March 2007

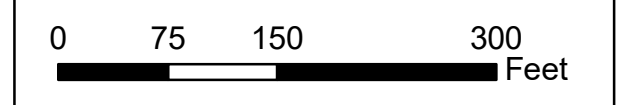
Figure B-5



Legend

- Sample Locations
- Consent Decree Boundary
- Remediation Unit
- Golf Course Placement Area


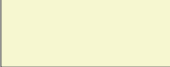

○ Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.

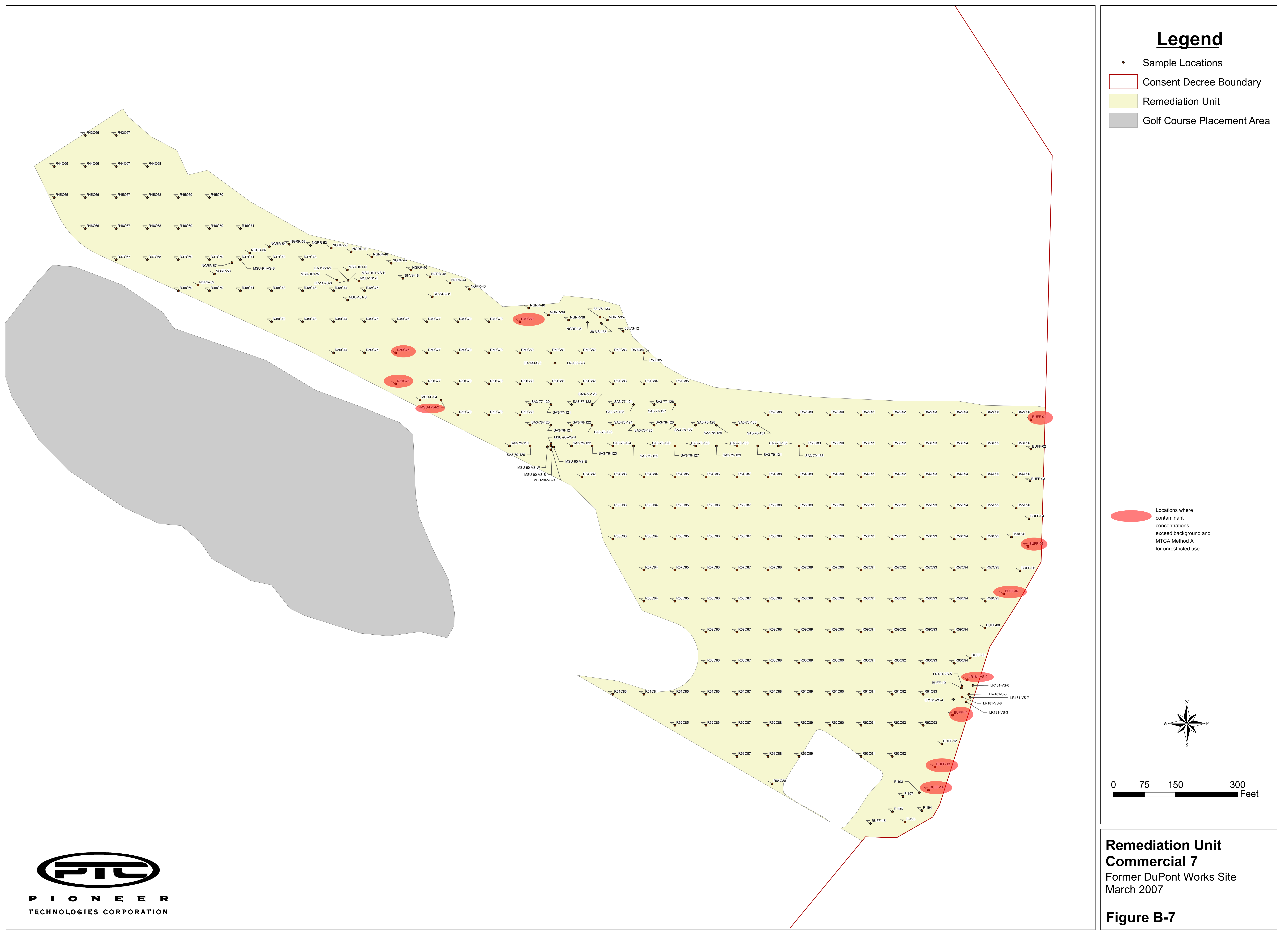


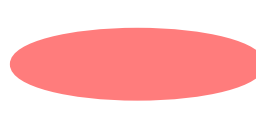
Remediation Unit Commercial 6
Former DuPont Works Site
March 2007

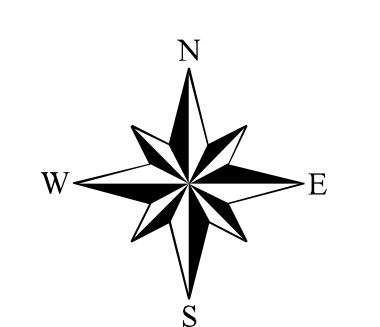
Figure B-6

Legend

- Sample Locations
-  Consent Decree Boundary
-  Remediation Unit
-  Golf Course Placement Area



 Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.

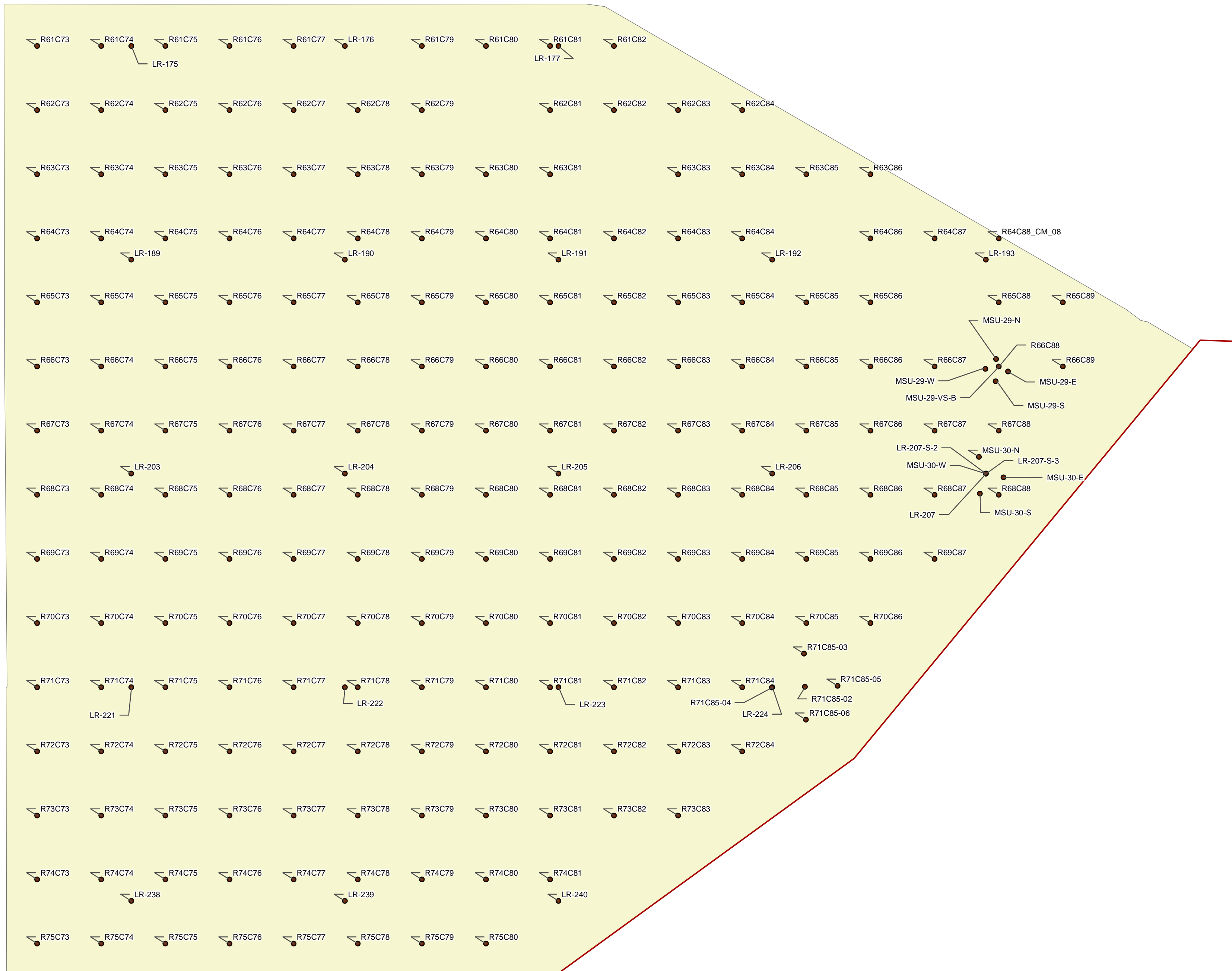


0 75 150 300 Feet



Remediation Unit Commercial 7
Former DuPont Works Site
March 2007

Figure B-7



Legend

- Sample Locations
- Consent Decree Boundary
- Remediation Unit
- Golf Course Placement Area

○ Locations where contaminant concentrations exceed background and MTCA Method A for unrestricted use.



Remediation Unit Commercial 8
 Former DuPont Works Site
 March 2007
Figure B-8