REMEDY SELECTION PLAN FOR DEMOLITION AREA 1 DECISION DOCUMENT ADDENDUM

July 2013

The United States Environmental Protection Agency (EPA) seeks your feedback on this Remedy Selection Plan for an addendum to the Decision Document for the Demolition Area 1 (Demo 1) site located on the Camp Edwards portion of the Massachusetts Military Reservation (MMR). The Remedy Selection Plan explains the cleanup alternatives considered for the site, which alternative is proposed, and why.

The Army National Guard's Impact Area Groundwater Study Program's (IAGWSP), investigations and cleanup at Demo 1 have been conducted under the oversight of EPA and the Massachusetts Department of Environmental Protection (MassDEP), under the authority of EPA's Safe Drinking Water Act Administrative Orders (SDWA 1-97-1019 and SDWA 1-2000-0014), and in consideration of the substantive cleanup standards of the Massachusetts Contingency Plan (MCP).

The Demolition Area 1 site is part of IAGWSP's ongoing cleanup. In 2006, EPA selected a comprehensive remedy for the Demo 1 Groundwater Plume. The remedy consisted of 5 extraction wells pumping at 906 gallons per minute (gpm), treatment at two treatment systems and reinjection of the groundwater via four reinjection wells. The remedy was expected to achieve risk-based levels of 0.6 parts per billion (ppb) for RDX in 11 years (2018) while reducing perchlorate concentrations to less than 2 ppb within the same timeframe. The remedy also included a contingency for additional active groundwater treatment if groundwater data or modeling indicated that groundwater exceeding federal or state regulatory or risk based levels migrated past the base boundary.

Data collected during a supplemental investigation indicated that perchlorate contamination exceeding acceptable levels had migrated beyond the base boundary as far as County Road in Pocasset. Updated groundwater modeling also suggested that the time to achieve cleanup may extend beyond the 11 years predicted in 2006. In response to these findings, a base boundary extraction well and treatment system was installed as an interim measure in June 2011. In addition, EPA required the development of a technical memorandum to evaluate alternatives for addressing the groundwater contamination that had migrated off base as well as alternatives to expedite cleanup of the on base contamination. This document presents the results of that evaluation. Figure 1 shows a side-by-side presentation of the plume as it was known in 2006 and 2013.

HOW TO PARTICIPATE

EPA is proposing to add an extraction well off-base to address contamination that has migrated past the base boundary (see Alternative 4A on page 8). EPA wants your feedback on the proposed alternative and is seeking public comment over the next 30 days (July 17 through August 16, 2013). Please review the cleanup alternative proposed in this Remedy Selection Plan, and send your comments on it to us. After the comment period ends, EPA will consider the public comments, consult with MassDEP, and issue a Decision Document providing the details of the remedial actions selected for the site. With the Decision Document, EPA will include a Responsiveness Summary that provides responses to comments received during the public comment period. MassDEP will issue its official position in a comment letter after the public comment period has ended. You are invited to a presentation during the MMR Cleanup Team meeting on July 24, 2013 at 6:00 p.m. at Building 1805 on the MMR to learn more about the groundwater contamination at Demolition Area 1, and the proposed remedy.

Public Comment Period for the Remedy Selection Plan

July 17, 2013 through August 16, 2013

Oral comments may be offered at the Public Meeting or written comments may be submitted by U.S. mail or email no later than August 16, 2013.

Public Information Meeting/Public Hearing

July 24, 2013
Massachusetts Military Reservation
Building 1805 West Outer Road
Camp Edwards, MA 02542

Written comments should be mailed to:

Kate Renahan
US EPA Region 1
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Or sent by:

Fax: (617) 918-0020
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BACKGROUND

Demolition Area 1 is located on Camp Edwards northeast of the Otis Rotary in Bourne. A 7.4-acre, 45-foot deep natural topographic depression, or kettle hole, was used from the mid-1970s until 1997 for training and disposal of munitions, fireworks, explosives and other items. Investigations identified contamination by RDX, other explosives and perchlorate in both the Demolition Area 1 groundwater and source area.

In 2004, a response action removed 28,000 tons of soil and approximately 90,000 metallic items, including munitions, metal items found in pits, and 400 tons of scrap metal. The excavated soil, along with close to 20,000 tons of soil removed from six other source areas, was treated on-site using thermal desorption, a technology where soil is heated to high temperatures to destroy contaminants.

That same year, an interim groundwater treatment system began addressing contaminated groundwater at Demo 1. The system consisted of two extraction wells and four modular treatment units (MTUs) positioned at two locations along the center of the plume, on Frank Perkins and Pew Roads on Camp Edwards. In 2006, a Decision Document (DD) was signed that expanded the interim system to include a total of five extraction wells pumping at a rate of 1.3 million gallons per day. A permanent treatment facility was built on Frank Perkins Road to replace three of the MTUs. The alterative chosen in the DD included the contingency that additional extraction wells be added if the plume was found to migrate further than expected. In 2009, a DD addendum stating that no further action was needed at the source area was issued. In the fall of 2010, groundwater monitoring wells at the base boundary showed detections of perchlorate; therefore, an additional extraction well and treatment system were installed in 2011 and began treating the portion of the plume that had migrated towards the base boundary.

Currently, the treatment system operates six extraction wells pumping at a combined rate of 665 gallons per minute (gpm) (Frank Perkins Road D1-EW-1 at150 gpm, D1-EW-501 at 150 gpm, D1-EW-502 at 100 gpm, and D1-EW-503 at 100 gpm; Pew Road D1-EW-2 at 100 gpm; and Base Boundary D1-EW-3 at 65 gpm). The water is re-injected via four reinjection wells and one infiltration basin. The system treats 964,000 gallons per day and since 2006 has treated 2.2 billion gallons of groundwater. These systems cost $6.1 million to build.

Demolition Area 1 in 1997 before source control actions such as soil excavation and treatment as well as removal of UXO, MEC and MEC-related items

Demolition Area 1 in 2007 after source control actions and site restoration

DEMOLITION AREA 1 TECHNICAL MEMORANDUM

A Technical Memorandum – *Demolition Area 1 Response Action Groundwater Treatment System Alternatives Analysis* – was recently issued and summarizes activities conducted to present an assessment of the Demo 1 groundwater plume (including the off-base, leading edge portion). It provides the basis for the Decision Document Addendum. The technical memorandum covers additional data that has been collected, updates to the groundwater model and an alternatives analysis.

The cleanup objectives for the site are to restore the useable groundwater to its beneficial use wherever practicable, within a timeframe that is reasonable given the particular circumstances of the site; to provide a level of protection in the aquifer that takes into account that the Cape Cod Aquifer (including the Sagamore Lens) is a sole source aquifer that is susceptible to contamination; and to prevent ingestion and inhalation of groundwater containing the contaminants of concern (COCs) (RDX, TNT, 2,4-DNT and perchlorate), in excess of federal maximum contaminant levels (MCLs), Health Advisories, drinking water equivalent levels (DWELs), applicable State cleanup standards or an unacceptable excess lifetime cancer risk or non-cancer Hazard Index.

The groundwater cleanup levels used in the Technical Memorandum are 2 parts per billion (ppb) for perchlorate, which is the Massachusetts drinking water standard (Maximum Contaminant Level, or MMCL), and 0.6 ppb for RDX, which is the concentration in drinking water that would be expected to cause an increased lifetime cancer risk of one in a million (sometimes called the 10^{-6} cancer risk level). These cleanup levels are more protective than the EPA Lifetime Health Advisories (concentrations that are not expected to cause any adverse non-cancer effects for a lifetime of exposure) for perchlorate (15 ppb) and RDX (2 ppb).

The technical memorandum evaluated alternatives with Focused Extraction for achieving the groundwater cleanup objectives. The alternatives developed in the technical memorandum were intended to help EPA address two questions: 1) what additional actions are necessary to address the contamination that has migrated past the base boundary and 2) are additional actions appropriate to achieve cleanup of the plume within the time frames required by the 2006 comprehensive remedy? For more details on the alternatives see the Technical Memorandum available on both the EPA and IAGWSP web sites.

The IAGWSP developed conceptual designs for these alternatives, including:

- Number, location, and sampling frequency of existing locations needed to monitor the plumes;
- Number and location of any new monitoring wells, if needed;
- Number and location of extraction and injection wells, estimated groundwater extraction flow rates, and cleanup timeframes;
- Type, size, and location of treatment facilities;
- Preliminary schedule for construction and operation; and
- Preliminary cost estimate.

The conceptual designs for the alternatives are based on the following information:

- Plume extent and concentrations as delineated based on the most up to date groundwater analytical data;
- Predictions of groundwater flow and contaminant fate and transport as estimated using groundwater modeling;
- Use of modular treatment systems with ion exchange resin and/or granular activated carbon vessels (similar to those currently in use by the IAGWSP).
- Continuation of groundwater monitoring (where applicable) for three years after cleanup objectives are achieved.

Preliminary cost estimates were prepared for each alternative. Each estimate includes the following components:

- Capital costs, which are expenditures required to initiate and install a remedial action. The cost estimates do not include the $6.1 million associated with the previously constructed treatment systems;
- Operation and maintenance (O&M) and Land Use Controls costs, which are post-implementation costs, such as monitoring, labor, reporting, electricity costs, equipment replacement and disposal of treatment residuals, necessary to ensure the continued effectiveness of the remedial action; The cost estimates do not include the approximately $6 million associated to operate and maintain the previously constructed treatment systems;
- Present worth analyses; and
- Indirect costs, including engineering services.

All alternatives outlined in this Remedy Selection Plan include Land Use Controls, long-term groundwater monitoring and five year reviews. Land Use Controls consist of measures that would prevent human exposure to groundwater plume contaminants and prevent actions that would interfere with the remedy. In this case, the Land Use Controls would restrict well drilling or other activities that could expose individuals to contaminated groundwater or interfere with treatment system components (e.g. pipelines, extraction wells and treatment systems). Land Use Controls would be monitored to ensure effectiveness. The long-term monitoring would consist of groundwater monitoring to determine if the remedy is performing as planned and when contaminant concentrations reach cleanup levels. Reporting on monitoring results and periodic updating of the sampling plan also are included.

DECISION DOCUMENT ADDENDUM

The leading edge of the Demo 1 plume has been a concern since the finalization of the 2006 Decision Document. While the base boundary extraction well was designed to stop any further contamination from migrating off-base, EPA and MassDEP requested additional data be collected off-base to determine how far the groundwater plume had migrated and to update the plume boundaries. They also requested an assessment of the entire Demolition Area 1 groundwater plume, to determine if the cleanup timeframes originally presented in the 2006 Decision Document could be met. Monitoring wells were installed off-base in 2011 and 2012. The wells installed during the off-base investigations identified that a plume of perchlorate contaminated groundwater had migrated more than 3,700 feet west of the base boundary. The historic maximum detection in this portion of the plume was 13 ppb; the current maximum detection is 5.7 ppb.

In addition to the installation of off-base monitoring wells, water level measurements were collected from 160 monitoring wells and six area ponds. The groundwater flow model was updated to reflect the new data and an alternatives analysis was conducted using the model. The alternatives developed were intended to help EPA address two questions: 1) what additional actions are necessary to address the contamination that has migrated past the base boundary and 2) are additional actions appropriate to achieve cleanup of the plume within the time frame (11 years) required by the 2006 comprehensive remedy?

Eight alternatives were developed and evaluated in the Technical Memorandum. After reviewing the Technical Memorandum, EPA determined that the Decision Document Addendum and this Remedy Selection Plan will be limited to a review of only those alternatives addressing the off base contamination (Alternatives 3, 4 and 4A). Correspondingly, costs presented in this Remedy Selection Plan for these alternatives reflect only the off-base portion of the remedy. The costs presented in Technical Memorandum are for the entire system. These alternatives will be compared to Alternative 1, operation of the current system with monitored natural attenuation for the off base contamination. The remaining alternatives (Alternatives 2, 5, 6A and 7) focus on optimizing the current system to address contamination remaining on base. Generally, each plume undergoes routine optimization evaluations and changes resulting from these routine optimizations are documented in the Annual Environmental Reports. If significant changes are necessary to optimize a system, a Decision Document Addendum would be issued to address those changes. At this time, only minor changes to the current on base system are recommended to optimize that system and those changes are not the subject of this Decision Document Addendum.

CRITERIA FOR EVALUATING THE CLEANUP REMEDY

As documented in the technical memorandum, an analysis was performed on all of the alternatives presented for Demolition Area 1. The evaluation used the EPA evaluation criteria listed below to select the proposed response action for the site. These nine criteria are summarized as follows:

1. Overall protection of human health and the environment; which includes prevention of the movement of contaminants into the aquifer and its preservation as a public drinking water supply: Will the remedy protect human health? Will it restore the aquifer?
2. Compliance with regulations: Does the remedy meet all applicable federal and state standards?
3. Long-term effectiveness and permanence: What are the remaining risks after completion of the remedial action? What is the adequacy and suitability of controls, if any, that are used to manage untreated contaminants remaining at the site?
4. Reduction of toxicity, mobility, and volume through treatment: What is the expected reduction in toxicity, mobility or volume? What are the type and quantity of treatment residuals that will remain following treatment?
5. Short-term effectiveness: Is the community protected during the remedial action? Are workers protected during the remedial action? What are the environmental impacts to natural resources? How long will it be before remedial response objectives are achieved?
6. Implementability: Is it technically and administratively feasible to design and construct the technology? How reliable is it? Can effectiveness be monitored? Are the services and materials available?
7. Cost: What are the capital costs of the remedy? What are the operations and maintenance costs? What is the net present value of the costs?
8. State Acceptance: What issues and concerns might the State have regarding each alternative? This criterion will be evaluated throughout the development, screening and evaluation of alternatives based on comments and input received from MassDEP.
9. Community Acceptance: What issues and concerns might the public have regarding each alternative? This criterion will be evaluated based on public feedback, such as comments made at the public meeting, or written comments submitted during the public comment period or at the public meeting.

A summary of the comparison of each alternative's strength and weakness with respect to the nine evaluation criteria is included on page 7.

DEMOLITION AREA 1 ALTERNATIVES

Alternative 1 – Current System with Monitored Natural Attenuation for the Off-base Contamination.

Capital Cost	$ 517,000
O&M Costs	$ 1,860,000
Site closeout and documentation	$ 88,000
Total Present Value	$ 2,362,000

Alternative 1 would provide for extraction and treatment of the groundwater using the current system. Under this alternative:

- The plume located past the base boundary would be restored using monitored natural attenuation, no further active treatment would be implemented.
- A long-term groundwater monitoring plan would be implemented and optimized as required to monitor the migration and restoration of the off base plume.
- LUCs would be implemented to prevent use of contaminated portions of the aquifer for drinking water and prevent actions that would interfere with the remedy.
- Monitoring, reporting and site-closeout documentation would be completed.

Contamination within the plume is expected to drop below the 2 ppb MMCL for perchlorate by 2026 and is expected to reach background levels by 2059. RDX concentrations are expected to decrease below the 10^{-6} risk-based level of 0.6 ppb by 2022 and reach background levels by 2025.

Alternative 3 – Current System with One Off-base Extraction Well East of Lily Pond

Capital Cost	$ 1,661,000
O&M Costs	$ 1,960,000
Site closeout and documentation	$ 88,000
Total Present Value	$ 3,628,000

Alternative 3 would provide for extraction and treatment of the groundwater using the current system with modifications. Under this alternative:

- The pump and treat system would be modified to include:
  - One new off-base extraction well (upgradient of Lily Pond, operating at 100 gpm, see figure 2).
  - Treatment with granular activated carbon and ion-exchange resin by expanding the base boundary treatment unit to handle the increased capacity from the off-base extraction well.
  - Infiltration of the treated water with a new infiltration trench located at the base boundary.
- A long-term groundwater monitoring plan would be implemented and optimized as required to monitor the migration and restoration of the off base plume.
- LUCs would be implemented to prevent the use of contaminated portions of the aquifer for drinking water and prevent actions that would interfere with the remedy.
- Monitoring, reporting and site-closeout documentation would be completed.

Contamination within the plume is expected to drop below the 2 ppb MMCL for perchlorate by 2021 and is expected to reach background levels by 2055. RDX concentrations are expected to decrease below the 10^{-6} risk-based level of 0.6 ppb by 2022 and reach background levels by 2025.

The new off-base extraction well would be installed east of Lily Pond approximately at the intersection of Williams Avenue and Windrush Avenue (see Figure 2). Piping from this extraction well would pass under Williams Avenue, under Route 28 and back onto the MMR property. The extraction well is located in a neighborhood which is heavily populated and has narrow roadways which could result in some disruption during construction.

This alternative requires directional drilling under Route 28, a state highway, requiring the approval of Mass Highway. In addition, property easements would be required to construct extraction wells and associated piping.

Alternative 4 – Current System with Two Off-base Extraction Wells

Capital Cost	$ 3,000,000
O&M Costs	$ 2,486,000
Site closeout and documentation	$ 88,000
Total Present Value	$ 5,500,000

Alternative 4 would provide for extraction and treatment of the groundwater using the current system with modifications. Under this alternative:

- The pump and treat system would be modified to include:
  - Two new off-base extraction wells (one west and one east of Lily Pond, operating at 100 gpm each, see figure 2).
  - Treatment with granular activated carbon and ion-exchange resin by expanding the base boundary treatment unit and adding a new off-base modular treatment unit (MTU) west of Lily Pond.
  - Infiltration of the treated water with a new base boundary infiltration trench and another one in an area west of Lily Pond.
- A long-term groundwater monitoring plan would be implemented and optimized as required to monitor the migration and restoration of the off base plume.
- LUCs would be implemented to prevent the use of contaminated portions of the aquifer for drinking water and prevent actions that would interfere with the remedy.
- Monitoring, reporting and site-closeout documentation would be completed.

Contamination within the plume is expected to drop below the 2 ppb MMCL for perchlorate by 2021 and is expected to reach background levels by 2046. RDX concentrations are expected to decrease below the 10^{-6} risk-based level of 0.6 ppb by 2022 and reach background levels by 2025.

A new off-base extraction well would be installed east of Lily Pond approximately at the intersection of Williams Avenue and Windrush Avenue. Piping from this extraction well would pass under Williams Avenue, under Route 28 and back onto the MMR property. The extraction well is located in a neighborhood which is heavily populated and has narrow roadways which could result in some disruption during construction. This alternative requires directional drilling under Route 28, a state highway, requiring the approval of Mass Highway.

A second off-base extraction well would also be installed on private property west of Lily Pond along with a MTU to treat the extracted groundwater. This property is currently in a state of receivership which complicates access. In addition, the property contains a failed septic system up-gradient of the proposed extraction well which may require modifications to the MTU to address.

Property easements would be required to construct extraction wells and an infiltration gallery, treatment units and the associated piping.

Alternative 4A – Current System with One Off-base Extraction Well West of Lily Pond

Capital Cost	$ 1,420,000
O&M Costs	$ 2,530,000
Site closeout and documentation	$ 88,000
Total Present Value	$ 4,000,000

Alternative 4A would provide for extraction and treatment of the groundwater using the current system with modifications. Under this alternative:

- The pump and treat system would be modified to include:
  - One new off-base extraction well (west of Lily Pond, operating at 100 gpm, see figure 2).
  - Treatment with granular activated carbon and ion-exchange resin by adding a new off-base MTU west of Lily Pond.
  - Infiltration of the treated water with a new infiltration trench (west of Lily Pond).
- A long-term groundwater monitoring plan would be implemented and optimized as required to monitor the migration and restoration of the off base plume.
- LUCs would be implemented to prevent the use of contaminated portions of the aquifer for drinking water and prevent actions that would interfere with the remedy.
- Monitoring, reporting and site-closeout documentation would be completed.

Contamination within the plume is expected to drop below the 2 ppb MMCL for perchlorate by 2025 and is expected to reach background levels by 2059. RDX concentrations are expected to decrease below the 10^{-6} risk-based level of 0.6 ppb by 2022 and reach background levels by 2025.

A new off-base extraction well would be installed on private property west of Lily Pond along with a MTU to treat the extracted groundwater and an infiltration trench to inject treated water back into the ground. This property is currently in a state of receivership which complicates access. In addition, the property contains a failed septic system up-gradient of the proposed extraction well which may require modifications to the MTU to address.

Property easements would be required to construct extraction wells, treatment units and the associated piping.

EVALUATION OF ALTERNATIVES FOR THE DEMOLITION AREA 1 PLUME

Below is a summary of how the alternatives were evaluated in the Technical Memorandum.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

All alternatives would be protective of human health and the environment. Each has provisions for plume monitoring and Land Use Controls to help prevent future exposure to contaminated groundwater.

COMPLIANCE WITH REGULATIONS

All alternatives are expected to eventually result in compliance with applicable regulations.

LONG-TERM EFFECTIVENESS AND PERMANENCE

All alternatives are expected to provide long-term effectiveness and permanence; however, the timeframes differ. The source areas have been removed so residual soil contamination is unlikely to compromise the permanence of the remedial alternatives once completed. Alternatives 3, 4, and 4A, provide additional capture in the portion of the plume with off-base extraction wells. Since Alternatives 4 and 4A capture more of the plume, there is less uncertainty regarding the fate of the plume that remains and migrates down gradient. Without the off-base extraction wells, groundwater modeling indicates that the plume migrates and crosses County Road.

Alternative	RDX Predicted Cleanup Times 0.6 ppb *10^{-6} Cancer Risk Level*	Perchlorate Predicted Cleanup Times 2 ppb *MMCL*
1	2022	2026
3	2022	2021
4	2022	2021
4A	2022	2025

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

Except Alternative 1, all alternatives reduce the toxicity, mobility and volume of contaminated groundwater through treatment. Alternatives 4 and 4A remove the most mass and therefore provide the greatest reduction of toxicity, monility and volume through treatment.

Alternative	Estimated Mass Captured (pounds)	
	Perchlorate	RDX
1	6.43	2.06
3	7.99	2.24
4	10.55	2.42
4a	10.05	2.28

SHORT-TERM EFFECTIVENESS

Alternative 1 has the least impact on workers, the community and the environment since it requires operating and maintaining the existing system. Additional monitoring wells may be installed to monitor the migration of the plume which would cause some short term impacts. Alternatives 3, 4, and 4a have impacts due to construction of extraction wells, piping, mobile treatment units, infiltration trenches and other components. Impacts from Alternative 4A would be less than Alternatives 3 and 4 because the location of the treatment system would be located on a private property and not within public road ways.

IMPLEMENTABILITY

Alternatives 1 is the most easily implemented alternative since it requires minimal action including continued operation and maintenance of the current Demo 1 treatment systems and the installation of additional monitoring wells. Alternatives 3, 4, and 4A would require installation of new extraction wells, infiltration trenches, MTUs, and other treatment system components both on and off-post. In addition, they will require extra safety precautions, coordination with the community and school system, impact to roads and personal property and easements with private landowners and the Town of Bourne.

EVALUATION OF ALTERNATIVES FOR THE DEMOLITION AREA 1 PLUME (CONT.)

COST

The costs of alternatives increase as the amount of treatment increases. Alternative 1 has a total estimated cost of $2,362,000, Alternative 3 - $3,628,000, Alternative 4 - $5,500,000, and Alternative 4A - $4,000,000.

STATE ACCEPTANCE

This criterion is continually evaluated as MassDEP participates in all aspects of the evaluation and selection of a remedy. MassDEP will issue its' official position in a comment letter after the public comment period has ended.

COMMUNITY ACCEPTANCE

This criterion will be evaluated based on all public comments received on the Remedy Selection Plan.

PROPOSED REMEDY FOR THE DEMOLITION AREA 1 PLUME

ALTERNATIVE 4A – CURRENT SYSTEM WITH ONE OFF-BASE EXTRACTION WELL WEST OF LILY POND

Alternative 4A consists of the current extraction system (500 gpm at Frank Perkins Road, 100 gpm at Pew Road, and 65 gpm at Base Boundary) and one new off-base extraction well (west of Lily Pond, pumping at 100 gpm). Extracted water from the new well will be piped to a new mobile treatment unit west of Lily Pond on private property. Treated water will be discharged to an infiltration trench. This alternative includes modifying the system to optimize the system performance. The estimated cost of the proposed remedy is approximately $4,000,000.

- The remedy is expected to achieve cleanup levels of 2 ppb for perchlorate by 2025 and 0.6 ppb for RDX by 2022 as contaminated groundwater is extracted and treated.
- Human health is protected through the use of groundwater monitoring to ensure that groundwater modeling predictions regarding the reduction and migration of contamination are correct and that any remaining contamination remains below cleanup levels.
- Human health will be further protected through extending the Land Use Controls to areas off-base where the Demolition Area 1 plume currently is found above cleanup levels. These controls and the existing controls for the portion of the plume on-base will prevent the use of contaminated portions of the aquifer for drinking water until contamination is reduced to below cleanup levels.
- Estimated capital cost of the proposed remedy is approximately $1,420,000 and the present worth total cost is $4,000,000.

Additional data will be collected to optimize the off-base extraction well location west of Lily Pond. There are obstacles associated with the property where the extraction well and treatment system are proposed. The property is currently in state receivership and there is a failed septic system up-gradient of the proposed off-base extraction well. However, these obstacles are less compared to the other alternatives involving treatment. The IAGWSP, EPA and MassDEP will work with the owner and receiver of the property to obtain access for implementing the remedy. Also, as part of the design process the IAGWSP will conduct research and site-specific testing to determine the impact the failed septic system may have on this remedy. If it is determined that contaminants from this failed septic system will impact this remedy, the IAGWSP will present to the EPA and MassDEP the design modifications required to account for those impacts as well as their associated costs. If access issues should significantly delay the implementation of the remedy, the EPA and MassDEP will evaluate options for modifying the remedy to achieve the cleanup objectives such as proposing an alternate location for the extraction well.

This alternative is proposed because it achieves permanent cleanup of RDX and perchlorate. This alternative restores the aquifer by actively treating the mass present, prevents migration of the plume beyond County Road and minimizes the uncertainty of letting the plume migrate untreated. Long-term groundwater monitoring and data analysis will be conducted to optimize the system components as needed while meeting cleanup goals. Land Use Controls will be extended to off-base areas and be maintained. Operation & maintenance of all treatment system components will be conducted. Five-year reviews will continue to be conducted for Demolition Area 1.

GLOSSARY OF TERMS AND ACRONYMS

10^{-6}	Concentration in drinking water that would be expected to cause an increased lifetime cancer risk of one in a million.
Background	A background level is the concentration of a hazardous substance that represents the level of the substance in an undisturbed environmental setting at or near the site.
Decision Document (DD)	Document that summarizes the response action selected to address contamination.
Feasibility Study (FS)	Document presenting and evaluating a range of alternatives for addressing contamination.
Granular activated carbon (GAC)	A treatment medium used to remove contaminants, such as explosives from groundwater.
Lifetime Health Advisory (HA)	Guideline established by EPA that represents the concentration of a chemical in drinking water that, given a lifetime of exposure, is not expected to cause adverse, non-cancerous effects.
Federal Maximum Contaminant Level (MCL)	Federal maximum contaminant level for drinking water.
Ion Exchange Resin (IX)	A treatment medium used to remove perchlorate from groundwater.
Land Use Controls (LUCs)	Administrative and/or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use
Massachusetts Maximum Contaminant Level (MMCL)	Maximum contaminant level for drinking water in the Commonwealth of Massachusetts.
Perchlorate	An oxidizer used in some munitions, fireworks, flares, pyrotechnics and other items.
Ppb	Parts per billion; used interchangeably with micrograms per liter (µg/L).
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine / Royal Demolition Explosive, a compound commonly used in explosives.
Rapid Response Action (RRA)	An interim cleanup action taken to reduce contamination while the investigation and selection of a response action is completed.
Remedial Investigation (RI)	Document that provides a summary of activities conducted and a synthesis of data gathered for the characterization of soil and groundwater associated with the site.
Remedy Selection Plan (RSP)	The document outlining the cleanup alternatives and the proposed remedy.

NEXT STEPS/UPCOMING ACTIVITIES

Following presentation of the Remedy Selection Plan for the Demolition Area 1 plume, EPA is holding a 30-day public comment period to provide an opportunity for public input. After consideration of public comments and consultation with MassDEP, EPA will issue a Decision Document that will detail the selected remedy. MassDEP will issue its official position in a comment letter after the public comment period has ended. A public informational session is scheduled during the MMR Cleanup Team meeting on July 24, 2013 at Building 1805 on the MMR.

FOR MORE INFORMATION

Contact the following individuals for more information:

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(508) 968-5630

Ellie Donovan – Massachusetts Department of Environmental Protection
(508) 946-2866

Kate Renahan – U.S. Environmental Protection Agency
(617) 918-1491

Or visit the EPA or IAGWSP Web sites at:

http://www.epa.gov/region1/mmr/index.html or **http://mmr-iagwsp.org/**

Information repositories have been established at the local public libraries in Bourne, Sandwich, and Falmouth to make information on the program available to the public. A complete repository of documents, including copies of work plans, sampling results, site reports, fact sheets, meeting minutes, and other materials, are available at the Jonathan Bourne Library in Bourne. All documents are available on the Cape Libraries Automated Materials Sharing (CLAMS) system.

Key documents related to the Demolition Area 1 site include:

- *Final Feasibility Study, Demolition Area 1 Groundwater Operable Unit*, August 2005
- *Remedy Selection Plan for the Demolition Area 1 Plume,* August 2005
- *Demolition Area 1 Decision Document Addendum,* June 2009
- *Demolition Area 1, Technical Memorandum, Response Action Groundwater Treatment System Alternatives Analysis,* July 2013

OPPORTUNITIES FOR PUBLIC COMMENT

The 30-day public comment period for the Remedy Selection Plan will be July 17 through August 16, 2013. EPA, MassDEP and IAGWSP representatives will be available at the public meeting or by phone to respond to questions regarding the site and proposed remedies. During the public comment period, comments can be submitted as follows:

By fax to:
(617) 918-0020

By mail to:
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By email to:
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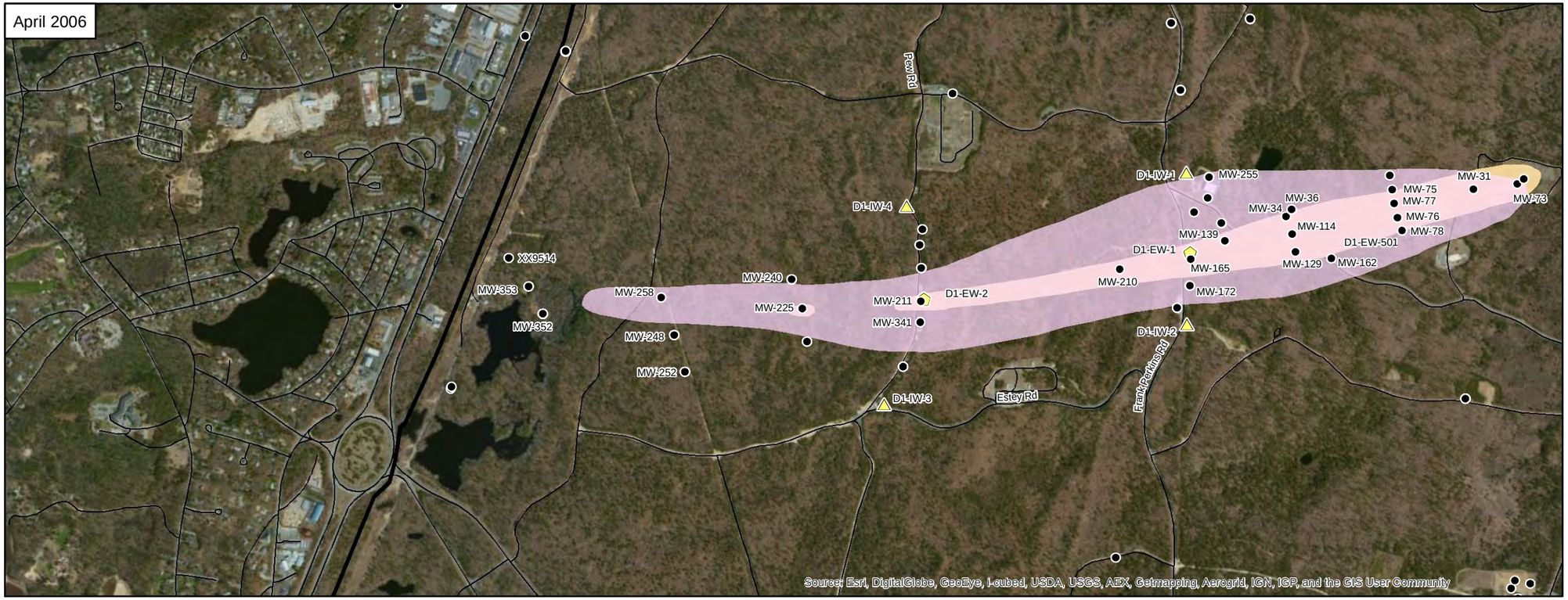
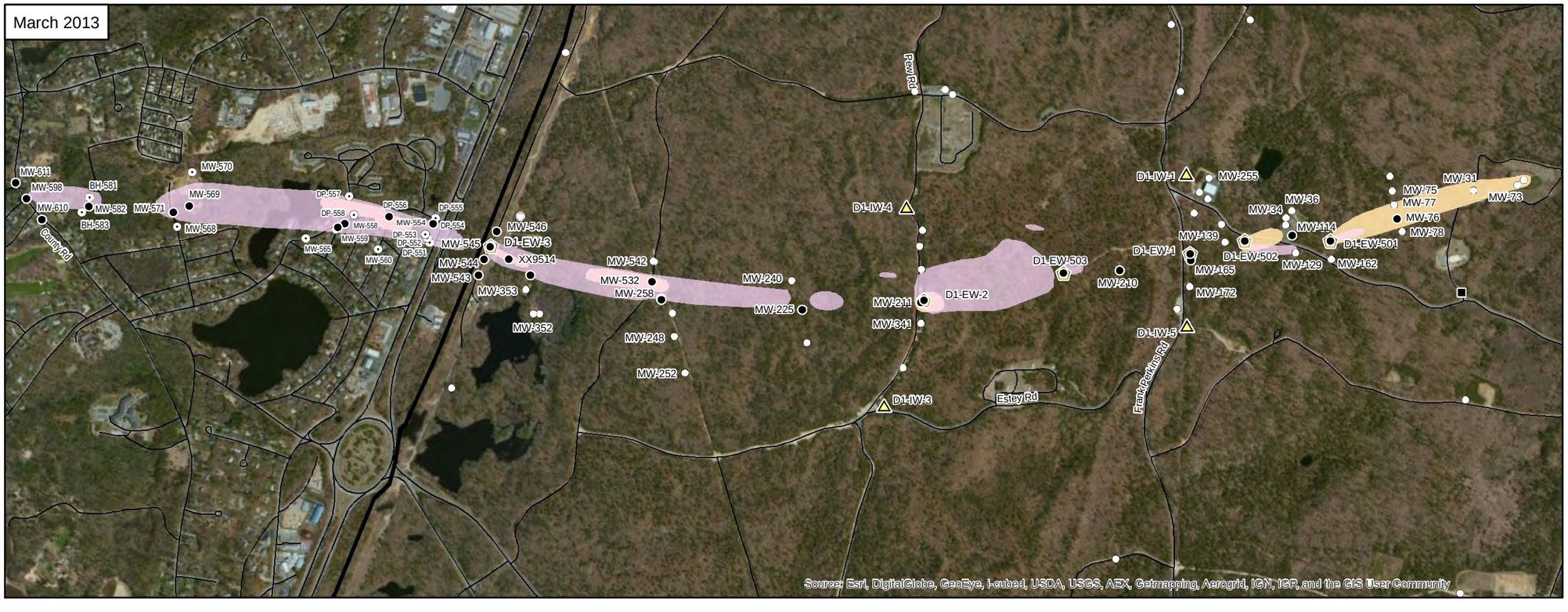
April 2006



March 2013



Impact Area Groundwater Study Program

LEGEND

- Extraction Well
- Injection Well
- Monitoring Well Included in the Network
- Monitoring Well Not Included in the Network
- Drive Point

Perchlorate in Groundwater

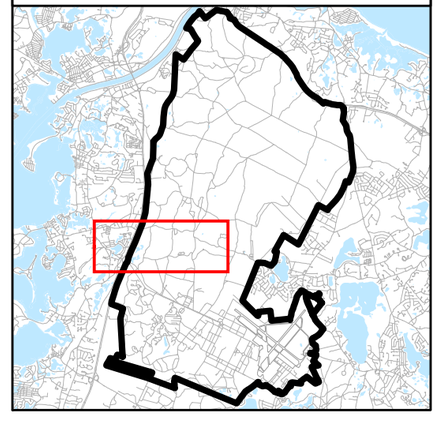
> 2 ppb

RDX in Groundwater

> 0.6 ppb

Note: Plume shell illustrated is representative of widest observed at each transect cross-section.

LOCATION MAP



NOTES & SOURCES

Basemap data from US Geological Survey 7 1/2 minute Topographic Maps. Source: MassGIS

Figure 1

Perchlorate and RDX Distribution in Groundwater April 2006 and March 2013 Demolition Area 1 Groundwater Operable Unit Technical Memorandum

0 1,250 Feet

US Army Corps of Engineers
New England District

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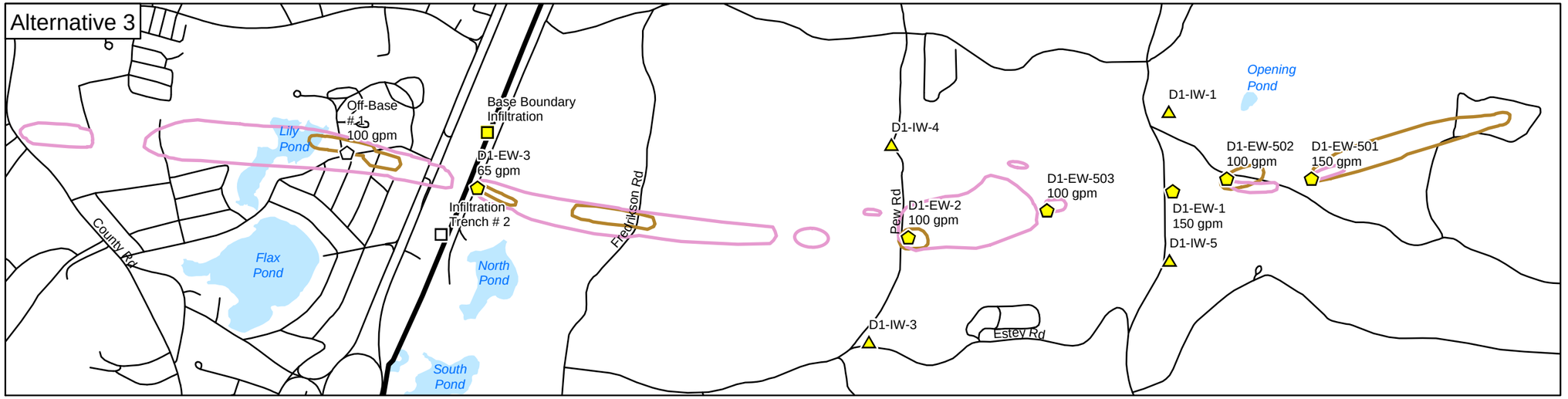
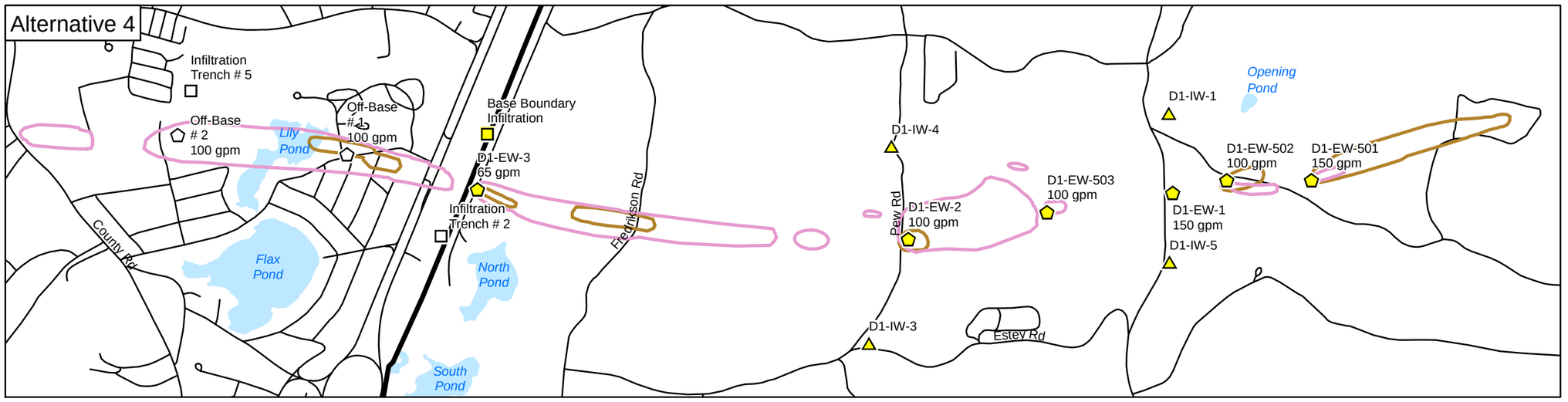
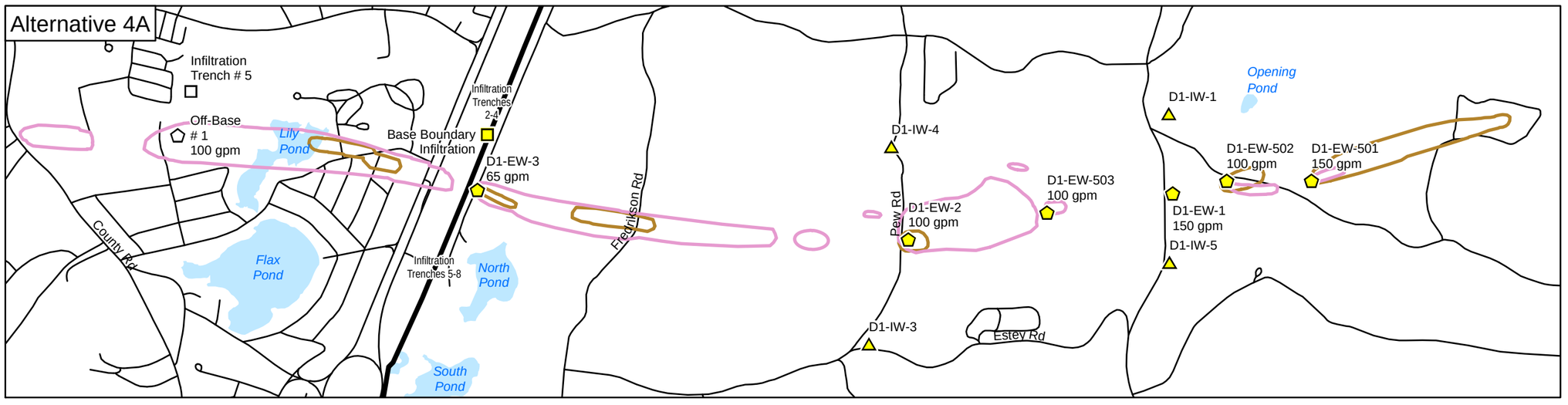
June 26, 2013 DWN: MTW CHKD: MRK







Impact Area Groundwater Study Program

LEGEND

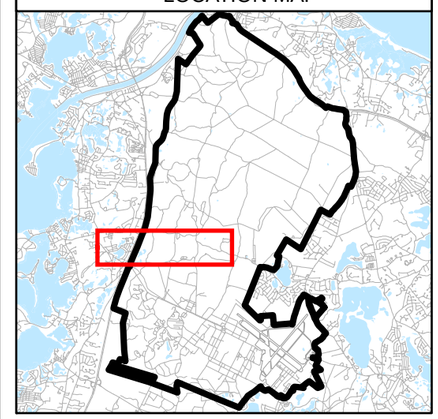
Existing	Alternatives
Extraction Well	Extraction Well
Injection Well	Infiltration Trench
Infiltration Trench	

Perchlorate in Groundwater
2 ppb Contour

RDX in Groundwater
0.6 ppb Contour

Note: Plume shell illustrated is representative of widest observed at each transect cross-section, Groundwater data through March 2013.

LOCATION MAP



NOTES & SOURCES

Basemap data from US Geological Survey 7 1/2 minute Topographic Maps. Source: MassGIS

TITLE

Alternatives 3, 4 and 4A
Demo 1 Groundwater Operable Unit

0 1,250
Feet

N

US Army Corps of Engineers
New England District

FIGURE
2

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July 1, 2013 DWN: MTW CHKD: DLH