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REVISED PROPOSED APPROACH FOR THE BUILDING 81 FEASIBILITY STUDY NAS
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**REVISED PROPOSED APPROACH FOR THE BUILDING 81 FEASIBILITY STUDY
NOVEMBER 7, 2011
FORMER NAVAL AIR STATION SOUTH WEYMOUTH, WEYMOUTH, MA**

SITE BACKGROUND

Building 81 was the Base motor pool and was used by Navy for vehicle maintenance from the 1950s to early 1990. An underground storage tank (UST) located near Building 81 was used for the storage of waste oil generated by these activities. This UST was identified as the primary source of volatile organic compounds (VOCs) and other contaminants of concern (COCs) detected in soil and groundwater at the Building 81 Site.¹ Navy conducted removal actions in 1991, 1994 and again in 1998 to address the UST and surrounding contaminated soils. During these removal actions, the UST was removed and approximately 1,400 cubic yards of contaminated soil was excavated and disposed off-site. The 1998 removal action also included a limited excavation to address an area of PAH-contaminated shallow soils identified to the east of the UST. Approximately 50 cubic yards of PAH-contaminated soil was excavated from this area and disposed off-site.

The overburden at the Building 81 Site is primarily silty sand with gravel. Depth to groundwater is approximately 5-8 feet bgs. Depth to bedrock is approximately 20 feet bgs. The bedrock is fractured and a discontinuous weathered bedrock is present. Bedrock contamination is found at depths up to 60 feet bgs, although most of the groundwater flow is reported to occur in the upper bedrock.

An in-situ chemical oxidation (ISCO) treatment test was conducted by Navy at the Building 81 Site in 2000-2001 to assess whether concentrations of chlorinated and other VOCs in groundwater (primarily PCE, TCE, vinyl chloride and BTEX) could be significantly reduced. The ISCO pilot test included the installation of both overburden and bedrock wells in a treatment zone extending from the UST source area to the western end of the Building 81 foundation slab, which is still present at the Building 81 Site. The ISCO treatment program was somewhat effective in reducing the concentrations of BTEX compounds in groundwater, but less effective in reducing the concentrations of the chlorinated VOCs. While the removal actions conducted in 1991, 1994 and 1998 removed a significant amount of contaminated soil from the Site, Navy's December 2010 Draft Final Remedial Investigation (RI) indicates that additional sources of contamination may remain in soil in the vicinity of the former UST. VOC concentrations in groundwater were somewhat reduced as a result of the in-situ treatment test conducted in 2000-2001, but significant groundwater contamination remains.

¹ As used herein, the "Building 81 Site" is defined by the boundaries of the groundwater contaminant plume associated with the former Building 81. The current boundaries of the Building 81 Site are shown on the attached Exhibit A.

The Building 81 Site is located north of Hangar 1 in an area primarily designated in the Reuse Plan and Zoning By-Laws as Recreational (RecD). RecD zoning allows a wide variety of recreational uses, including health clubs, skating rinks, and recreational fields. In addition, the RecD zoning allows institutional uses, such as schools and government buildings. The most current investigation data indicates that the VOC plume in groundwater is centered north of Hanger 1, to the east of Shea Memorial Drive. However, Navy's investigations also have detected TCE and PCE in deep overburden and bedrock groundwater wells west of Shea Memorial Drive, currently at concentrations below the MCLs. TCE, PCE, vinyl chloride and BTEX have not been detected in shallow groundwater samples west of Shea Memorial Drive.

Based upon the detection of VOCs in groundwater west of Shea Memorial Drive, a portion of the Building 81 Site extends into the Village Center District (VCD), which is west of Shea Memorial Drive and is designated in the Reuse Plan as a mixed-use area that will contain residential development as well as office, commercial and retail uses. The edge of the contaminated groundwater plume is also currently only approximately 150 feet north of the Mixed Use Village District (MUVD), which will contain a mix of residential housing types and neighborhood commercial uses. Based on the foregoing, the reasonably foreseeable future uses of the Building 81 Site include recreational, institutional, commercial, office, retail and residential uses.

The Building 81 Site is not within a potentially productive aquifer and the Local Redevelopment Authority, South Shore Tri-Town Development Corporation (SSTTDC), as well as the Master Developer, LNR South Shore LLC (LNR), have indicated that potable and irrigation water needs for the redevelopment can be provided by sources other than the groundwater under the Building 81 Site. Therefore, future use of groundwater under the Building 81 Site for drinking water or for irrigation are not exposure scenarios that need to be evaluated in the Feasibility Study (FS). Other potential exposure scenarios are addressed below in connection with the discussion of remedial alternatives for the Site.

HUMAN HEALTH RISK ASSESSMENT

Navy conducted a human health risk assessment (HHRA) as part of its December 2010 Draft Final RI for the Building 81 Site. The HHRA identified the following potential unacceptable risks to human health from contaminants at the Building 81 Site:

- A potential risk to future residents from the use of groundwater as drinking water. Contaminants contributing most significantly to this risk are PCE, TCE, vinyl chloride, chlorinated PAHs, arsenic, cadmium, and manganese;

- A potential risk to future construction workers from inhalation of VOCs in deep/narrow construction trenches. The contaminants contributing most significantly to this risk are naphthalene and PCE; and
- A potential risk to future residents from vapor intrusion into structures. The contaminants contributing most significantly to this risk are PCE and naphthalene.

No unacceptable risks were identified in the HHRA based on exposure to shallow site soils above the water table; risks associated with soils below the water table were not quantitatively evaluated. There is no surface water or sediment at the Building 81 Site, so no exposure scenarios were evaluated for these media in the HHRA. Exposure scenarios relating to groundwater used for irrigation also were not evaluated.

REMEDIAL ACTION OBJECTIVES

The following RAOs will be utilized in the FS for groundwater at the Building 81 Site:

GW-A: Prevent the migration of COC-impacted groundwater.

GW-B: Prevent exposure of construction workers to COCs at concentrations that pose unacceptable risk.

GW-C: Prevent exposure of potential building occupants to VOCs resulting from vapor intrusion into any future buildings on the site at concentrations that pose unacceptable risk.

GW-D: Prevent human exposure to COCs at groundwater in concentrations that pose unacceptable risk.

PRELIMINARY REMEDIATION GOALS

The following PRGs will be developed in the FS for the Building 81 Site:

- PRGs for groundwater will be calculated to protect potential receptors under the reasonably foreseeable future land use scenarios for the Site (recreational, institutional, commercial, office, retail and residential uses) based on risk-based values, using EPA's risk assessment guidance.
- PRGs for the vapor intrusion pathway will be vapor intrusion risk-based values and will be used for the shallow groundwater.
- PRGs for the construction worker pathway will be risk-based values and will be used for the shallow groundwater.

COMPONENTS OF REMEDIAL ALTERNATIVES

Based on the RAOs and PRGs discussed above, the primary components of remedial alternatives that will be evaluated in the FS are as follows:

- Soil Excavation – Removal of contaminated soil from areas near the source (e.g. former UST) will be quantitatively evaluated as a means to reduce or eliminate a potential continuing source of contamination to the groundwater.
- Permeable Reactive Barrier (PRB) – Use of one or more PRBs will be evaluated to prevent the migration of COC-impacted groundwater to the west of Shea Memorial Drive and/or otherwise into the VCD and MUVD in concentrations in excess of PRGs.
- Several active remedial technologies that can more aggressively reduce contaminant concentrations in groundwater and control migration at the Building 81 Site, including without limitation: a modified ISCO approach (with Fenton's Reagent, permanganate, persulfate and/or ozone as the active ingredient), and enhanced reductive dechlorination with a variety of electron donor compounds.
- Monitoring – Monitoring wells will be selected to monitor concentrations of COCs in overburden and bedrock groundwater to assess the progress of the remedy.
- Vapor Intrusion – Remedial components will seek to reduce risks from exposure to soil gas through active treatment of the groundwater plume.
- LUCs – See further discussion of the LUCs below.

LAND USE CONTROLS (LUCS)

As an initial matter, because the Building 81 Site is not located within a potentially productive aquifer and SSTTDC and LNR have indicated that the potable and irrigation water needs for the redevelopment can be provided by sources other than the groundwater under the Building 81 Site, future use of groundwater under the Building 81 Site for drinking water or irrigation are not exposure scenarios that need to be evaluated in the Feasibility Study (FS). Rather, a permanent LUC that prevents the use of groundwater at the Building 81 Site for potable (e.g., drinking water) or irrigation purposes will be employed (which will prevent exposure of residents to VOCs in groundwater at concentrations that pose unacceptable risk).

Second, use of the LUCs listed below, which SSTTDC and LNR have indicated would be consistent with the proposed future uses of the Base, will be evaluated by Navy in the FS in connection with the Remedial Alternatives discussed above. PRGs for the vapor intrusion and construction worker pathways will be utilized to establish an "LUC Compliance Boundary," which is currently anticipated to be somewhere near the eastern edge of Shea Memorial Drive. Areas upgradient of the LUC Compliance

Boundary may utilize the interim LUCs set forth below. Because COCs have not been detected in groundwater west of Shea Memorial Drive in concentrations in excess of MCLs, however, it is not anticipated that LUCs will be imposed downgradient of the LUC Compliance Boundary (west of Shea Memorial Drive or otherwise in the VCD or MUVD) except for the permanent LUC prohibiting potable or irrigation wells (as discussed in the preceding paragraph). In all cases, the LUCs identified below and analyzed in the FS will be narrowly tailored to the prevention of specific, identified risks and exposure scenarios identified in the HHRA and FS, and will be limited in both location and scope so as not to unreasonably burden or prohibit reasonably foreseeable uses anticipated by the Reuse Plan. The details of the following LUCs will be finalized during the remedial design.

1. An LUC restricting the type and nature of construction permitted in the small source area of the plume where the highest VOC concentrations have been detected and where active remediation is to be conducted, until PRGs are achieved.
2. An LUC requiring prior EPA and MassDEP approval of construction dewatering plans prior to excavation activities being conducted, until PRGs are achieved.
3. An LUC specifying health and safety procedures to be used by construction workers to prevent unacceptable exposure risks based upon risk-based values, until PRGs are achieved.
4. An LUC specifying passive building design methods, such as a sub-slab vapor mitigation system, to prevent exposure of building occupants to vapor intrusion from VOCs in groundwater at levels that pose an unacceptable risk, until PRGs are achieved.

