TATA & HOWARD

MEMORANDUM

To: Stantec **Date:** 5/24/16

From: Amanda Cavaliere **Copies:**

Subject: Summary of Groundwater Quality Enhancements by Raytheon Redevelopment - related to Wastewater Treatment Modifications

As requested, Tata & Howard, Inc., supported by the hydrogeological and civil engineering expertise provided by Sanborn Head and VHB, respectively, has prepared this overview of key components of the Raytheon property redevelopment located at 526-528 Boston Post Road, Sudbury, Massachusetts that will provide improved groundwater resource protection on the site. The proposed stormwater infrastructure on the site, associated with the redevelopment, has been the subject of several separate independent peer-reviews (and will be redeveloped in accordance with applicable Massachusetts Department of Environmental Protection stormwater guidelines). This memorandum focuses on the benefits to groundwater protection that derive from the plan to upgrade and expand the existing 25 year old wastewater treatment facility and disposal area, to treat and process up to 90,000 gallons per day (gpd), to allow sufficient capacity for the mixed-use redevelopment of the site, as well as to accommodate the needs of the potential fire station expansion.

The Project Site is approximately 50 acres in size and located at 526 and 528 Boston Post Road in Sudbury. Approximately 46 acres are zoned Limited Industrial (LID), and the remainder of the Site is zoned Residential A (RESA). The Site is bounded to the south by Boston Post Road (Route 20) and to the north by a former railroad right of way, with commercial and agricultural properties to the east and west. Figure 1 illustrates the existing site conditions.

The existing buildings, totaling 563,300 square feet, were constructed in several phases throughout the latter half of the 20th century, and beginning around 1958 by the former owner Raytheon (the "Former Owner"). The two main buildings are located on the industrially zoned portion of the property, and an approximately 7,000-square foot building (the Beltran building) is located on the residential portion of the Site. The remainder of the Site includes impervious parking surfaces (2,040 spaces), stormwater control features, landscaped areas and jurisdictional wetlands. Currently, approximately 28 acres of the 50-acre property is impervious area, comprised of buildings, parking areas and related infrastructure.

According to the most recently available data provided by the Massachusetts Natural Heritage and Endangered Species Program 2 (NHESP), the Site is not located within any Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife. There are no certified or potential vernal pools located on or adjacent to the Site. No portion of the Site is located within an Area of Critical Environmental Concern (ACEC). According to DEP, the Site is not located in an area designated as an Outstanding Resource Water 3.

The most recently issued Flood Insurance Rate Map (FIRM) 4 for the area (FEMA Floodway Map Number 25017C0506F, Panel 506, dated July 7, 2014, produced by the Federal Emergency Management Agency (FEMA)), indicates that the Project Site is not located within a 100- or 500-year floodplain.

As illustrated in the Table No. 1, the Project consists of several independent components which collectively will comprise a vibrant mixed-use development with new open space, retail and restaurants that will transform an obsolete and aging office, research and development site. In addition to these on-site amenities, the development provides walkable access to adjacent retail, office, and other services along Boston Post Road.

Table No. 1-Site Use and Building Size

Use	*Size*
Avalon	
Residential Apartment Homes	250 Homes Anticipated to be approximately 50% 1 bedroom, 40% 2 bedroom 10% 3 bedroom
Leasing Office	6,000 sf
Maintenance Shop	1,500 sf
National Development	
Memory Care Assisted Living (Bridges) Community	48 Units – 54 Beds
Active Adult Residential Condominium	Up to 60 condo units
Retail	Up to 80,000 sf total - 45k village grocery - 35k dry goods and restaurants
Total	**600,000 SF±**

The new uses will contribute to a vibrant mixed-use community, which is consistent with local planning and housing initiatives and will act as a catalyst for future planned development of the Route 20 corridor. The Project also includes local roadway improvements, major upgrades to the streetscape and landscaping, improved water quality and creative integration of existing environmental resources that form the framework of the development.

As illustrated in Figure 2, the retail component of the Project will abut Boston Post Road and serve as the main entrance to the development. Positioned behind the retail space and surrounding a central pond feature is the memory care assisted living community and active adult condominiums to the east and the mixed-income residential apartment community to the west.

In summary, below is a description of the existing conditions and proposed modifications to enhance the existing wastewater treatment facility and disposal area on the site.

Existing Wastewater Treatment Facility

- Discharge Limit = 50,000 gallons per day (gpd).
- Sequencing Batch Reactor (SBR).
- Single Train of Treatment.
- No Redundancy.
- Plant over 25 years old.
- Outdated technology.
- Odor concerns with current wastewater treatment process.
- Discharges to three (3) open sand beds for groundwater discharge.

Proposed Modifications to Wastewater Treatment Facility

- Increase Discharge Limit to a maximum daily flow of 90,000 gpd.
- Convert existing facility to Membrane Bioreactor (MBR) system that provides a physical barrier with very small pore openings.
- MBR will reliably achieve a higher removal rate of wastewater constituents (BOD, TSS, TN, Turbidity, etc.) providing consistent quality even at higher wastewater flows and loading rates.
- Added treatment redundancy.
- Upgrades to be designed to meet current MassDEP guidelines.
- Substantially improved water quality prior to discharge.
- Increased groundwater recharge.
- Positive odor control measures included.

- Replacement of old infrastructure with new pump station, gravity lines, and force main that will be inspected by the Town throughout installation.
- The proposed development will include a change to mixed land/water use resulting in wastewater generation which can be more efficiently treated at the proposed WWTP.
- The Hydrogeological Study will determine the exact size and location of the new leaching field and will determine whether or not it is feasible to make the new bed a subsurface leaching field.
- The project will include a Financial Assurance Mechanism (FAMs) which will provide funds in escrow for the WWTP to be maintained and operating at full capacity.

Permitting Status and Process

The existing 25 year old WWTP, is subject to an existing Groundwater Discharge Permit issued by DEP (see Attachment 2). All of the above changes and enhancements to the Plant and its leaching fields (including the proposed expansion of the plant from a "design flow" of 50,000 gpd to 90,000 gpd) will be permitted through a rigorous DEP Groundwater Discharge Permit Modification process, starting with review and approval of a detailed hydrogeological time-travel study. The Development team has met with DEP several times to discuss the upgrades and expansion of the plant. DEP has witnessed two rounds of test pits/perc tests on site. Preliminary conversations with DEP indicate that they are very supportive of our proposed expansion and upgrades assuming favorable results from the hydrogeologic time-travel analysis that we are preparing for their review and approval. As indicated in the attached Sanborn Head test pit logs (see Attachment 1), the test pit data is extremely favorable.

Protection of Environment

Protection of the environment is enhanced through planned upgrades to the wastewater treatment facility by utilizing state of the art treatment technology, providing redundancy, and meeting current DEP guidelines. The underlying aquifer will benefit from the improved technology, treatment and wastewater effluent flow that will be treated and processed at the new, expanded facility for recharge into the ground.

Time of Travel Analysis – Sanitary Wastewater System to Raymond Road Well Field

Please refer to correspondence prepared by Sanborn Head dated May 23, 2016 that is appended to this memorandum (Attachment 1).

MEADOW WALK
SUDBURY

526 and 528 Boston Post Road Redevelopment

Figure 1
Existing Site Condition

Existing Conditions Site Plan

Figure 2
Proposed Site Condition

Attachment 1

TATA & HOWARD

SANBORN HEAD
Building Trust. Engineering Success.

239 Causeway Street, Suite 105
Boston, MA 02114

Ms. Amanda Cavaliere
Tata & Howard
67 Forest Street
Marlborough, MA
01752

May 24, 2016
File No. 3888.03

Re: Time of Travel Analysis – Sanitary Wastewater System to Raymond Road Well Field
526 & 528 Boston Post Road
Sudbury, Massachusetts

Dear Amanda:

On behalf of Tata & Howard (Client), Sanborn, Head & Associates, Inc. (Sanborn Head) has prepared this letter to summarize our field exploration activities at the Site and our observations of subsurface conditions to perform a travel time analysis from the proposed sanitary wastewater discharge system to the Sudbury Water District drinking water wells on Raymond Road in Sudbury, Massachusetts. This information, along with historical information provided by Raytheon, the Town of Sudbury, and the Sudbury Water District has been used to create our conceptual hydrogeological model.

Existing Conditions and Project Description

The Site is located at 526 & 528 Boston Post Road (Route 20) in southern central Sudbury, Massachusetts and consists of approximately 50 acres of land previously owned and operated by the Raytheon Company (Raytheon) since 1958. Up until January 2016, an active wastewater treatment plant (WWTP) consisting of treated wastewater discharging to three (3) open sand leaching beds has been in operation in the northern portion of the Site, as shown on Figure 1. The beds are approximately 9,800 square feet in area. It is our understanding that the former distribution system rotated the discharged wastewater to the two eastern beds, and the western bed served as a reserve field. The Site is located within the Zone II Public Water Supply Protection Area for the Sudbury Water District Raymond Road water supply well field. The nearest residential properties are located approximately 300 feet northwest of the Site and 1,000 feet southwest and southeast of the Site. The Raymond Road well field is located approximately 0.3 miles southeast of the Site as shown on Figure 1.

The WWTP is currently permitted to treat and discharge 50,000 gallons per day (gpd) under its current groundwater discharge permit. The redevelopment plans include a proposed upgrade of the current WWTP to support an increase of the maximum daily flow to 90,000 gpd.

At this time, Sanborn Head is evaluating alternatives to support the increase in daily flow to 90,000 gpd. The proposed alternatives includes construction of subsurface leaching chambers, which is consistent with present-day construction practice. Figure 2 shows the existing sand bed configuration and Figure 3 shows the proposed system upgrade.

The following sections discuss subsurface conditions at the Site based on subsurface explorations and groundwater measurements by Sanborn Head and others. The subsurface explorations, groundwater gauging rounds, surficial geology, *Custom Soil Resource Report for Middlesex County, Massachusetts*[1], and the *Groundwater Model Documentation Supplement to Prolonged Pumping Test Report for New Well No. 9 Report*[2] (Sudbury Groundwater Model Supplement) have been used to create a conceptual hydrogeologic model to evaluate modifications to the wastewater discharge system and proposed additional flow.

Official Deep Observation Hole Test Pits

Seven (7) deep observation hole test pits (SH-TP-401 through SH-TP-407) were excavated to depths of approximately 10 feet below ground surface on March 9, 2016. In addition, five (5) deep observation hole test pits (SH-TP-408 through SH-TP-412) were excavated to depths of approximately 10 feet below ground surface on May 4, 2016. The test pits were observed and logged by a Sanborn Head Soil Evaluator and were performed under the observation of Mr. Stephen Hallem from the Northeast Regional Office (NERO) of the Massachusetts Department of Environmental Protection (DEP) and Mr. Bill Murphy of the Sudbury Board of the Health (BOH).

The test pits were completed within the vicinity of the existing sand bed area and in areas where the proposed system is anticipated to be located. The deep observation hole test pit logs are included as Attachment A. The approximate test pit locations are shown on Figure 4. The estimated seasonal high groundwater elevations at the test pit locations were estimated based on observations made in the field and our ground surface elevations interpolated between the existing ground surface contours shown on the recent topographic plan prepared by Vanasse Hangen Brustlin Inc. (VHB), dated October 2015.

Official Soil Percolation Tests and Infiltration Tests

Three (3) percolation tests were completed by a Massachusetts Soil Evaluator from Sanborn Head during our field program on March 9, 2016, and witnessed by Mr. Stephen Hallem of DEP. Three (3) additional percolation tests and four (4) Guelph permeameter/infiltration tests were completed on May 4, 2016 and witnessed by Mr. Stephen Hallem of DEP. Mr. Bill Murphy of the Sudbury BOH witnessed the percolation tests completed at SH-TP-402 and SH-TP-407.

Percolation tests were completed at SH-TP-402, SH-TP-404, SH-TP-407, SH-TP-408, SH-TP-411, and SH-TP-412 immediately adjacent to the deep observation hole test pits, at depths of approximately 38 to 102 inches below ground surface (bgs) – as noted on the attached logs. The observed soils generally consist of loamy sands, fine to coarse sands, and fine to medium sands without encountering a more restrictive layer; therefore, the sand layer was used for the percolation tests with the approval of Mr. Hallem. The measured percolation

[1] *Custom Soil Resource Report for Middlesex County, Massachusetts*, United States Department of Agriculture, Natural Resources Conservation Services, December 2015.

[2] *Groundwater Model Documentation Supplement to Prolong Pumping Test Report for New Well No. 9, Sudbury, Massachusetts*, H2O Engineering Consulting Associates, Inc., February 1993.

rates generally ranged from less than 2 minutes per inch to approximately 3.2 minutes per inch.

Guelph permeameter/infiltration tests were performed by Sanborn Head at SH-TP-402, SH-TP-408, SH-TP-411, and SH-TP-412. Results from the Guelph permeameter/infiltration tests generally ranged from 1 foot per day to 243 feet per day. The percolation test and Guelph permeameter logs are included in Attachment B. The approximate locations of the field tests are provided on Figure 4.

Estimated Depth to Seasonal High Groundwater

In accordance with the Sudbury Zoning Bylaw Article IX, Water Resource Protection Overly District (WRPOD) Section 4260, the maximum groundwater elevation throughout the entire area shall be determined by groundwater gauging from monitoring wells during the months of March, April, or May. Groundwater elevation data was collected by GZA GeoEnvironmental, Inc. in monitoring wells across the Site on September 13, 2007, September 29 and 30, 2008, April 30 and May 1, 2013, and March 19, 2015. In addition, Sanborn Head measured groundwater levels in a subset of these locations in the vicinity of the wastewater discharge system on November 12, 2015, December 11, 2015, January 7, 2016, and March 9, 2016. Groundwater measurements from gauging rounds are provided in Table 1. As noted in the logs, groundwater was observed in the deep hole observation test pits at: SH-TP-401 through SH-TP-403, SH-TP-407, and SH-TP-410 through SH-TP-412 at depths between 7 and 9 feet bgs (or approximately between El. 147.8 to El. 150.5 feet), which is consistent with the Site-wide groundwater measurements shown in Table 1.

Based on the collected groundwater measurements, and in accordance with the DEP approved method for estimating seasonally high groundwater, a Frimpter (1981) analysis was completed by Sanborn Head. As shown on Table 1, the estimated seasonal high groundwater levels range between approximately El. 149.5 feet and El. 152.3 feet.

Visual evidence of estimated seasonal high groundwater (i.e., soil mottling/redoximorphic features) was observed in 10 of the 12 official deep observation hole test pit excavations (SH-TP-401 through SH-TP-404, SH-TP-406 through SH-TP-409, and SH-TP-411 and SH-TP-412). Although redoximorphic features were noted on the logs in SH-TP-405 and SH-TP-410, these features were interpreted as an indication of influences from the existing open sand leaching beds. The visual observations of estimated seasonal high groundwater are consistent with the Frimpter-adjusted estimated seasonal high groundwater levels in nearby monitoring wells as shown in Table 1.

Subsurface Soil Conditions

In landscaped areas, the surface topsoil is generally 6 to 24 inches thick. Below the topsoil, there is a combination of discontinuous layers of subsoil, fill materials, and buried topsoil on the order of 0 to 8 feet thick. The fill generally consists of sand with varying amounts of silt and trace amounts of gravel.

Below the surface materials and fill material, the Site is underlain by natural glacial outwash deposits composed of sands and silts in discontinuous layers and strata. Based on

our understanding of subsurface conditions across the overall development from subsurface exploration logs by Sanborn Head and others, these deposits are greater than 25 feet thick. The materials vary from sand with trace to little amounts of silt and trace amounts of gravel to non-plastic silts and sand. At isolated locations near the top of the deposits, very few root particles and organic matter were encountered and are likely an indication of former grade and subsoil that was left in-place. The organic content is estimated to be less than 1 percent by weight. The material is typically very loose to medium dense.

Based on Site-wide explorations (approximately 62 explorations of depths ranging between 15 and 108 feet below ground surface), we understand the sand and silty sand deposits are underlain by glacial till at depths greater than 35 feet bgs within the existing leaching field area.

Subsurface information for the Raymond Road aquifer was obtained from the Sudbury Groundwater Model Supplement and surficial geology maps provided by the Massachusetts Office of Geographic Information (MassGIS). These reports indicate the Raymond Road aquifer consists of sand and gravel and fine-grained soil deposits approximately 25 to 110 feet thick and underlain by glacial till. Additionally, near surface organic soils can be found along depressions near streams within the Landham Brook watershed. For the purposes of creating a conceptual hydrogeologic model, we have assumed the subsurface conditions at the Raymond Road aquifer consist of loamy sand.

Travel Time Analysis

Based on the subsurface conditions observed at the Site and our review of the Sudbury Groundwater Model Supplement for the Sudbury Water District Raymond Road drinking water well field, a conceptual hydrogeologic model was created using Visual MODFLOW to estimate the travel time from the proposed wastewater discharge area to the well field based on the current discharge of 50,000 gpd, and a proposed daily flow of 90,000 gpd. It should be noted that the DEP requires a minimum of 2 years of travel time from leaching fields to the nearest public water supply well in accordance with the *DEP Guidelines for the Design, Construction, Operation, and Maintenance of Small Wastewater Treatment Facilities with Land Disposa*l, dated November 2014.

As discussed previously, subsurface conditions at the Site were modeled in accordance with observed conditions during subsurface explorations at the open sand leaching bed area. Subsurface conditions at the Raymond Road aquifer were modeled as loamy sand in accordance with the Sudbury Groundwater Model Supplement and MassGIS. Well construction details and pumping rates were provided by Ms. Rebecca McEnroe, Superintendent at the Sudbury Water District, and were incorporated into the model.

The travel time analysis was performed to estimate the length of time required for wastewater discharge from the leach fields to reach the Sudbury Water District Raymond Road drinking water well field. The travel time analysis was completed using the MODPATH package (with particle tracking) for Visual MODFLOW.

Based on the results of the hydrogeologic model, the estimated travel time it takes the wastewater discharge to reach the nearest Raymond Road drinking water supply well (Well No. 2) is as much as 20 years for both the existing and proposed design flow conditions for the deep groundwater flow regime. The groundwater discharge takes approximately 6 to 10 years to reach the nearest wellhead in the shallow groundwater flow regime.

As indicated by the models, the travel time to the well head is not significantly altered by the increase in daily flow to 90,000 gpd, and significantly exceeds the minimum 2-year travel time required by DEP. The MODFLOW output for the travel time analysis is provided in Attachment C.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Luke Norton, P.E.
Project Manager

Stan S. Sadkowski, P.E.
Senior Associate/ Vice President

Danielle M. Volpe, P.E.
Senior Project Engineer

DMV/LDN/SSS/PMP: dmv

Encl.

Table 1: Groundwater Elevation Data
Figure 1: Locus Plan
Figure 2: Existing Conditions
Figure 3: Proposed Conceptual Subsurface Bed
Figure 4: Exploration Location Plan
Attachment A: Test Pit Logs
Attachment B: Percolation Test Logs
Attachment C: Time Travel Analysis MODFLOW OUTPUT

cc: Mr. Steve Senna & Mr. David Gillespie (BPR Sudbury Development LLC);

TABLE

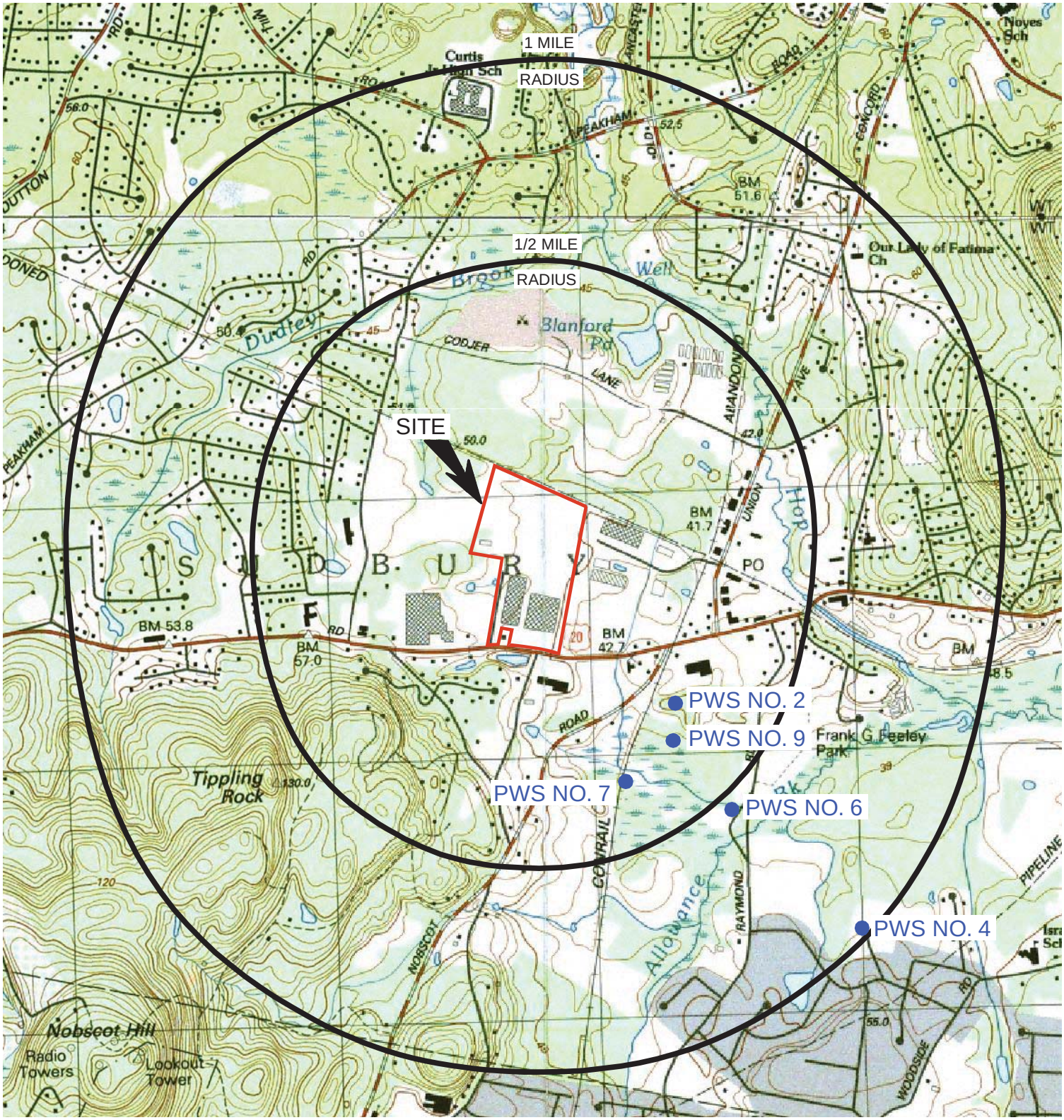
TABLE 1
Groundwater Elevation Summary Table
528 Boston Post Road, Sudbury, MA

Monitoring Well ID	Well Screen Interval (feet below top of PVC)	Reference Point Elevation (feet NAVD88)	Depth Elevation 3/19/2015		Depth Elevation 11/12/2015		Depth Elevation 12/11/2015		Depth Elevation 1/7/2016		Depth Elevation 3/9/2016		Frimpter Estimated Seasonal High Groundwater El. (feet NAVD88)
			Depth to Water (feet)	Groundwater El. (feet NAVD88)	Depth to Water (feet)	Groundwater El. (feet NAVD88)	Depth to Water (feet)	Groundwater El. (feet NAVD88)	Depth to Water (feet)	Groundwater El. (feet NAVD88)	Depth to Water (feet)	Groundwater El. (feet NAVD88)	
W-1	9 -19	158.68	9.83	148.85	11.41	147.27	11.43	147.25	10.76	147.92	10.04	148.64	150.56
W-2	9 -19	161.36	10.02	151.34	12.96	148.40	13.08	148.28	12.41	148.95	11.65	149.71	151.69
W-3	9 -19	158.47	8.95	149.52	11.53	146.94	11.48	146.99	10.47	148.00	9.96	148.51	150.23
W-4	9 -19	158.46	9.90	148.56	10.16	148.30	10.64	147.82	10.24	148.22	9.47	148.99	151.59
W-5	9 -19	161.51	8.31	153.20	12.52	148.99	12.52	148.99	11.42	150.09	10.54	150.97	152.28
W-6	9 -19	157.93	9.31	148.62	11.74	146.19	11.55	146.38	10.39	147.54	10.00	147.93	149.48

Notes:

1. Groundwater levels measured by Sanborn Head personnel on the dates indicated.
2. Reference elevations surveyed by BSC Group on September 14, 2007 and corrected to NAVD88 with a correction factor of 0.774 feet.
3. Frimpter estimated seasonal high groundwater values were calculated by adding 3.3 feet to the November 12, 2015 groundwater elevation data.

FIGURES



Legend:

- Community and Non-Community Public Water Supply Well (from MassGIS online database records)

NOTES:
Base map was taken from the "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Information Technology Division"
7.5 minute USGS Quadrangle Maps: Sudbury, Massachusetts, REV: 1987

Drawn By: D.Dombrowsky
Designed By: D.Volpe
Reviewed By: L.Norton
Project No: 3888.03
Date: May 2016

SCALE: 1" = 1,700'

SANBORN HEAD

Figure 1

Locus Plan

Time of Travel Analysis

528 Boston Post Road
Sudbury, Massachusetts

NOTES:

1. THE BASE MAP WAS TAKEN FROM AN ELECTRONIC PLAN ENTITLED, "EXISTING CONDITIONS SITE PLAN", PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, RECEIVED MAY 23, 2016 WITH AN ORIGINAL SCALE OF 1" = 100'.

SANBORN HEAD

GRAPHICAL SCALE
100' 50' 0' 100' 200'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: L.NORTON
REVIEWED BY: S.SADKOWSKI
PROJECT MGR: L.NORTON
PIC: S.SADKOWSKI
DATE: MAY 2016

TIME OF TRAVEL ANALYSIS
528 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS

EXISTING CONDITIONS PLAN

PROJECT NUMBER: 3888.03

SHEET NUMBER: 2

NOTES:

1. THE BASE MAP WAS TAKEN FROM AN ELECTRONIC PLAN ENTITLED, "PROPOSED CONCEPTUAL SUBSURFACE BED," PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, RECEIVED MAY 23, 2016 WITH AN ORIGINAL SCALE OF 1"=100'.

SANBORN HEAD

GRAPHICAL SCALE
100' 50' 0' 100' 200'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: L.NORTON
REVIEWED BY: S.SADKOWSKI
PROJECT MGR: L.NORTON
PIC: S.SADKOWSKI
DATE: MAY 2016

TIME OF TRAVEL ANALYSIS
528 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS

PROPOSED CONCEPTUAL SUBSURFACE BED

PROJECT NUMBER: 3888.03

SHEET NUMBER: 3

NOTES:

1. THE BASE MAP WAS DRAWN FROM A PLAN ENTITLED, "EXISTING CONDITIONS PLAN OF LAND", PREPARED BY VANASSE HANGEN BRUSTLIN, INC. (VHB) OF WATERTOWN, MA, DATED OCTOBER 12, 2015 WITH AN ORIGINAL SCALE OF 1" = 40'.
2. EXPLORATIONS DESIGNATED SH-101(W) THROUGH SH-107 AND SH-301 THROUGH SH-306 WERE ADVANCED BY CRAWFORD DRILLING SERVICES, LLC (CDS) OF WESTMINSTER, MA AND OBSERVED BY SANBORN HEAD BETWEEN NOVEMBER 13 AND 17, 2015.
3. TEST PITS DESIGNATED SH-TP-401 THROUGH SH-TP-412 WERE ADVANCED BY GENESIS UTILITIES CORPORATION OF QUINCY, MA AND OBSERVED BY SANBORN HEAD ON MARCH 9, 2016.
4. EXPLORATION DESIGNATED SH-9 AND SH-10 WERE ADVANCED BY GEOSEARCH AND OBSERVED BY SANBORN HEAD ON MAY 29, 2015.
5. APPROXIMATE LOCATIONS OF EXPLORATIONS BY SANBORN HEAD ARE BASED ON TAPED MEASUREMENTS MADE IN THE FIELD RELATIVE TO PROMINENT SITE FEATURES. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
6. APPROXIMATE LOCATIONS OF EXPLORATIONS BY OTHERS ARE BASED ON PLANS BY OTHERS. THIS DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

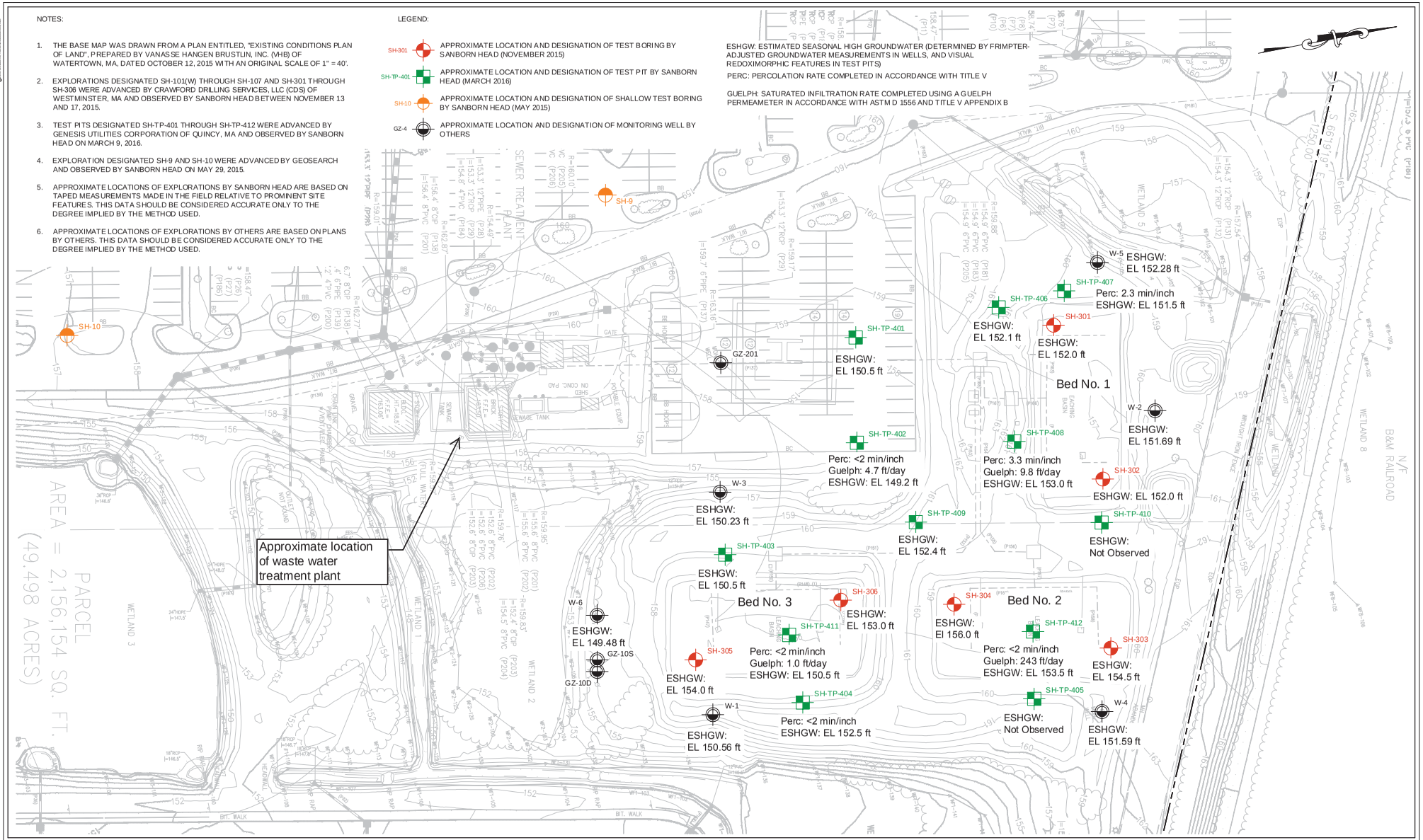
LEGEND:

- SH-301 — APPROXIMATE LOCATION AND DESIGNATION OF TEST BORING BY SANBORN HEAD (NOVEMBER 2015)
- SH-TP-401 — APPROXIMATE LOCATION AND DESIGNATION OF TEST PIT BY SANBORN HEAD (MARCH 2016)
- SH-10 — APPROXIMATE LOCATION AND DESIGNATION OF SHALLOW TEST BORING BY SANBORN HEAD (MAY 2015)
- GZ-4 — APPROXIMATE LOCATION AND DESIGNATION OF MONITORING WELL BY OTHERS

ESHGW: ESTIMATED SEASONAL HIGH GROUNDWATER (DETERMINED BY FRIMPTER-ADJUSTED GROUNDWATER MEASUREMENTS IN WELLS, AND VISUAL REDOXIMORPHIC FEATURES IN TEST PITS)

PERC: PERCOLATION RATE COMPLETED IN ACCORDANCE WITH TITLE V

GUELPH: SATURATED INFILTRATION RATE COMPLETED USING A GUELPH PERMEAMETER IN ACCORDANCE WITH ASTM D 1556 AND TITLE V APPENDIX B



SANBORN HEAD

GRAPHICAL SCALE
80' 40' 0 80' 160'

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: L.NORTON
REVIEWED BY: S.SADKOWSKI
PROJECT MGR: L.NORTON
PIC: S. SADKOWSKI
DATE: MAY 2016

TIME OF TRAVEL ANALYSIS
528 BOSTON POST ROAD
SUDBURY, MASSACHUSETTS

EXPLORATION LOCATION PLAN

PROJECT NUMBER: 3888.03
SHEET NUMBER: 4

ATTACHMENT A

TEST PIT LOGS

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	07:46
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±158.5			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-401 Location (Identify on site Plan): Helipad Parking Lot

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-14	FILL	10 YR 5/4	--	--	--	Fine to Coarse Sand	5	--	Single Grained	Loose	1, 2
14-36	FILL	10 YR 4/3	--	--	--	Fine to Coarse Sand	5	--	Single Grained	Loose	3, 4
36-50	FILL	10 YR 4/3	--	--	--	Loamy Sand	5	--	Massive	Very Friable	
50-65	Ob	10 YR 3/2	--	--	--	Sandy Loam	--	--	Massive	Friable	5
65-90	C_1	10 YR 5/2	--	--	--	Sandy Loam	--	--	Massive	Friable	
90-108	C_2	10 YR 6/2	96"	7.5 YR 4/6	20	Sandy Loam	--	--	Massive	Friable	

Additional Notes:
1. Ground surface consists of 4-inches of asphalt pavement.
2. Fill layer consistent with granular base course for pavement.
3. Fill layer contains 3-foot diameter blast rock fragments/boulders.
4. 3-inch diameter pavement underdrain at an approximate depth of 3 feet damaged during excavation and trapped water drained into test pit.
5. Perched groundwater encountered at top of organic layer.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 104" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: 96"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	8:30
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±157.2			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-402 Location (Identify on site Plan): Helipad Parking Lot

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-8	FILL	10 YR 4/3	--	--	--	Fine to Coarse Sand	5	5	--	--	1, 2
8-20	FILL	10 YR 4/4	--	--	--	Fine to Coarse Sand	5	10	--	--	
20-38	FILL	10 YR 4/4	--	--	--	Loamy Sand	--	--	--	--	
38-40	Ab	10 YR 4/3	--	--	--	Sandy Loam	--	--	--	--	
40-49	B_w	2.5 YR 5/6	--	--	--	Sandy Loam	--	--	--	--	
49-120	C_1	2.5 YR 5/4	96"	10 YR 4/6	20	Sandy Loam	--	--	--	--	3

Additional Notes:
1. Ground surface consists of 3-inches of asphalt pavement.
2. Fill layer consistent with granular base course for pavement.
3. Percolation test completed within C_1 layer; top of hole at an approximate depth of 40-inches.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 96" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: 96"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	9:30
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±158.5			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-403 Location (Identify on site Plan): West of Bed #3

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-84	FILL	10 YR 3/4	--	--	--	--	--	--	--	--	
84-126	C_1	10 YR 5/1	96"	10 YR 5/8	50	--	--	--	--	--	

Additional Notes:

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 123" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: 96"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	10:30
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±159			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-404 Location (Identify on site Plan): East of Bed #3

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-38	FILL	10 YR 5/3	--	--	--	Fine to Coarse Sand	3	--	Single Grained	Loose	
38-54	Ab	10 YR 3/2	--	--	--	Loamy Sand	--	--	Massive	V. Friable	
54-66	B_w	10 YR 5/4	--	--	--	Loamy Sand	--	--	Massive	V. Friable	
66-120	C_1	10 YR 6/3	78"	10 YR 5/8	15	Sandy Loam	--	--	Massive	V. Friable	1, 2

Additional Notes:
1. Redoximorphic features not present with depth; interpreted as possible leaching bed mound.
2. Percolation test completed within C_1 layer; top of hole at an approximate depth of 66-inches.

Groundwater Observed: No If Yes; Depth Weeping from Pit Face: N/A Standing Water in the Hole: N/A

Estimated Depth to Seasonal High Ground Water: 78"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	12:30
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±160.5			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-405 Location (Identify on site Plan): East of Bed #2

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-36	FILL	10 YR 3/3	--	--	--	Fine to Coarse Sand	--	--	Single Grained	Loose	
36-120	C_1	10 YR 5/3	51"	10 YR 5/8	50	Fine to Coarse Sand	--	--	Single Grained	Loose	1

Additional Notes:
1. Redoximorphic features observed throughout C_1 layer consistent with stratified sand deposits; not interpreted as evidence of SHGW.

Groundwater Observed: No If Yes; Depth Weeping from Pit Face: N/A Standing Water in the Hole: N/A

Estimated Depth to Seasonal High Ground Water: Not Observed

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	13:15
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±160.5			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-406 Location (Identify on site Plan): Southwest of Bed #1

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-24	FILL	10 YR 3/2	--	--	--	Fine to Coarse Sand	5	3	Single Grained	Loose	
24-48	FILL	10 YR 2/2	--	--	--	Fine to Coarse Sand	3	--	Massive	Very Friable	
48-60	FILL	10 YR 4/3	--	--	--	Loamy Sand	--	--	Massive	Very Friable	
60-62	Ab	10 YR 2/2	--	--	--	Sandy Loam	--	--	Massive	Very Friable	
62-66	B_w	10 YR 4/3	--	--	--	Sandy Loam	--	--	Massive	Friable	
66-108	C_1	2.5 YR 5/3	101"	10 YR 4/6	10	Loamy Sand	--	--	Massive	Very Friable	

Additional Notes:

Groundwater Observed: No If Yes; Depth Weeping from Pit Face: N/A Standing Water in the Hole: N/A

Estimated Depth to Seasonal High Ground Water: 101"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name:	Tata & Howard, Inc.	Date:	03/09/2016
Site Address:	528 Boston Post Road	Client Address:	67 Forest Street	Time:	14:10
Project No.:	3888.03		Marlborough, MA		
Ground Surface Elev. (ft):	±159.5			Weather :	Sunny, 50°F

Deep Hole Number: SH-TP-407 Location (Identify on site Plan): West of Bed #1

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-34	FILL	10 YR 3/2	--	--	--	Fine to Coarse Sand	5	3	Single Grained	Loose	
34-48	FILL	10 YR 2/2	--	--	--	Fine to Coarse Sand	5	--	Single Grained	Loose	
48-66	Ab	10 YR 4/3	--	--	--	Sandy Loam	--	--	Massive	Friable	
66-74	B_w	10 YR 2/2	--	--	--	Sandy Loam	--	--	Massive	Friable	
74-120	C_1	10 YR 4/3	96"	2.5 YR 5/6	--	Sandy Loam	--	--	Massive	Friable	1

Additional Notes:
1. Percolation test completed within C_1 layer; top of hole at an approximate depth of 84-inches.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 118" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: 96"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name: Tata & Howard, Inc.	Date: 5/12/2016
Site Address:	528 Boston Post Road	Client Address: 67 Forest Street	Time: 9:30
Project No.:	3888.03	Marlborough, MA	
Ground Surface Elev. (ft):	±160		Weather : Sunny, 70°F

Deep Hole Number: SH-TP-408 Location (Identify on site Plan): South of Bed #1

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-18	A	10YR 3/2	--	--	--	Loamy Sand	5	--	Weak Subangular	Friable	
18-61	FILL	10YR 4/4	--	--	--	Fine to Medium Sand	--	--	Single Grained	Loose	1
61-74	C_1	10YR 6/4	--	--	--	Fine to Medium Sand	--	--	Single Grained	Loose	
74-120	C_2	10YR 5/6	84"	7.5 YR 5/8	6	Loamy Sand	--	--	Massive	V. Friable	2

Additional Notes:
1. 6-inch diameter unknown utility pipe at an approximate depth of 4.5 feet damaged during excavation.
2. Redoximorphic features not present with depth; interpreted as possible leaching bed mound.
3. Percolation test completed within C_1 layer; top of hole at an approximate depth of 74-inches.

Groundwater Observed: No If Yes; Depth Weeping from Pit Face: N/A Standing Water in the Hole: N/A

Estimated Depth to Seasonal High Ground Water: 84" (See Note 2)

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name: Tata & Howard, Inc.	Date: 5/12/2016
Site Address:	528 Boston Post Road	Client Address: 67 Forest Street	Time: 11:30
Project No.:	3888.03	Marlborough, MA	
Ground Surface Elev. (ft):	±160		Weather : Sunny, 70°F

Deep Hole Number: SH-TP-409 Location (Identify on site Plan): West of Beds #2 and #3

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-52	FILL	10YR 3/2	--	--	--	Sandy Loam	10	<5	Structureless	Friable	1
52-59	B_W	10YR 5/6	--	--	--	Loamy Sand	--	--	Massive	V. Friable	
59-86	C_1	10YR 6/4	--	--	--	Fine to Medium Sand	--	--	Single Grained	Loose	
86-114	C_2	10YR 6/2	91"	10 YR 5/8	8	Loamy Sand	--	--	Massive	V. Friable	

Additional Notes:
1. Fill layer consists of stockpiled organic topsoil.

Groundwater Observed: No If Yes; Depth Weeping from Pit Face: N/A Standing Water in the Hole: N/A

Estimated Depth to Seasonal High Ground Water: 91"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name: Tata & Howard, Inc.	Date: 5/12/2016
Site Address:	528 Boston Post Road	Client Address: 67 Forest Street	Time: 11:00
Project No.:	3888.03	Marlborough, MA	
Ground Surface Elev. (ft):	±159		Weather : Sunny, 70°F

Deep Hole Number: SH-TP-410 Location (Identify on site Plan): Between Beds #1 and #2

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-8	FILL	10YR 6/4	--	--	--	Fine to Course Sand	--	--	Structureless	Loose	
8-14	A_b	10YR 3/3	--	--	--	Loamy Sand	--	--	Weak Subangular	Friable	
14-108	C_1	10YR 6/4	30"	7.5 YR 6/8	12	Fine to Course Sand	--	--	Single Grained	Loose	1

Additional Notes:
1. Redoximorphic features observed throughout C_1 layer consistent with stratified sand deposits; not interpreted as evidence of SHGW.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 102" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: Not Observed

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name: Tata & Howard, Inc.	Date: 5/12/2016
Site Address:	528 Boston Post Road	Client Address: 67 Forest Street	Time: 10:00
Project No.:	3888.03	Marlborough, MA	
Ground Surface Elev. (ft):	±156		Weather : Sunny, 70°F

Deep Hole Number: SH-TP-411 Location (Identify on site Plan): Bed #3

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-21	FILL	10YR 6/3	--	--	--	Fine to Coarse Sand	--	--	Structureless	Loose	
21-31	A_b	10YR 3/3	--	--	--	Loamy Sand	--	--	Weak Subangular	Friable	
31-41	B_W	10YR 5/6	--	--	--	Fine to Medium Sand	--	--	Single Grained	Loose	
41-96	C_1	10YR 6/4	66"	7.5 YR 5/6	4	Fine to Medium Sand	--	--	Single Grained	Loose	1

Additional Notes:
1. Percolation test completed within C_1 layer; top of hole at an approximate depth of 41-inches.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 84" Standing Water in the Hole: 92"

Estimated Depth to Seasonal High Ground Water: 66"

Test Pit Logs

Site Location:	Sudbury, Massachusetts	Client Name: Tata & Howard, Inc.	Date: 5/12/2016
Site Address:	528 Boston Post Road	Client Address: 67 Forest Street	Time: 10:30
Project No.:	3888.03	Marlborough, MA	
Ground Surface Elev. (ft):	±158		Weather : Sunny, 70°F

Deep Hole Number: SH-TP-412 Location (Identify on site Plan): Bed #2

Depth (inches)	Soil Horizon or Layer	Soil Matrix Color (Moist)	Redoximorphic Features			Soil Texture (NRCS)	Coarse Fragments (% by Volume)		Soil Structure	Soil Consistence (Moist)	Other
			Depth	Color	Percent		Gravel	Cobbles			
0-28	FILL	10YR 6/3	--	--	--	Fine to Coarse Sand	--	--	Structureless	Loose	
28-108	C_1	10YR 6/4	54"	7.5 YR 5/6	8	Fine to Coarse Sand	--	--	Single Grained	Loose	1, 2

Additional Notes:
1. Isolated redoximorphic features present above 54-inches; interpreted as possible leaching bed mound.
2. Percolation test completed within C_1 layer; top of hole at an approximate depth of 28-inches.

Groundwater Observed: Yes If Yes; Depth Weeping from Pit Face: 102" Standing Water in the Hole: No

Estimated Depth to Seasonal High Ground Water: 54"

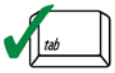
ATTACHMENT B

PERCOLATION TEST LOGS

Commonwealth of Massachusetts
City/Town of Sudbury
Percolation Test
Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	3/9/2016			
Observation Hole #	SH-TP-402			
Depth of Perc	Top of Hole 40" Bottom of Hole 58"			
Start Pre-Soak	8:26 (00:00)			
End Pre-Soak	8:41 (15:00)			
Time at 12”	8:41 (15:00)			
Time at 9”	8:42 (16:47)			
Time at 6”	8:45 (19:00)			
Time (9”-6”)	02:13			
Rate (Min./Inch)	<2 min/in			
	Test Passed: ☒		Test Passed: ☐	
	Test Failed: ☐		Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Nell Briggs (Soil Evaluator No. 13938)
Test Performed By:

Bill Murphy (Sudbury BOH) and Stephen Hallem (DEP)
Board of Health Witness

Comments:

22 gal. used in pre-soak

Commonwealth of Massachusetts
City/Town of Sudbury
Percolation Test
Form 12

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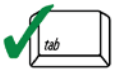

A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	3/9/2016			
Observation Hole #	SH-TP-404			
Depth of Perc	Top of Hole 66" Bottom of Hole 84"			
Start Pre-Soak	13:30 (00:00)			
End Pre-Soak	13:38 (07:45)			
Time at 12”	13:38 (07:47)			
Time at 9”	13:40 (9:40)			
Time at 6”	13:40 (10:02)			
Time (9”-6”)	0:22			
Rate (Min./Inch)	<2 min/in			
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Nell Briggs (Soil Evaluator No. 13938)
Test Performed By:

Stephen Hallem (DEP)
Board of Health Witness

Comments:

24 gal. used in pre-soak;

Commonwealth of Massachusetts
City/Town of Sudbury
Percolation Test
Form 12

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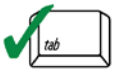

A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	3/9/2016			
Observation Hole #	SH-TP-407			
Depth of Perc	Top of Hole 84" Bottom of Hole 102"			
Start Pre-Soak	11:26 (00:00)			
End Pre-Soak	11:41 (15:00)			
Time at 12”	11:41 (15:00)			
Time at 9”	11:47 (20:52)			
Time at 6”	11:54 (27:45)			
Time (9”-6”)	6:53			
Rate (Min./Inch)	2.3 min/in			
	Test Passed: ☒		Test Passed: ☐	
	Test Failed: ☐		Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Nell Briggs (Soil Evaluator No. 13938)
Test Performed By:

Bill Murphy (Sudbury BOH) and Stephen Hallem (DEP)
Board of Health Witness

Comments:

8 gal. used in pre-soak

Commonwealth of Massachusetts
City/Town of Sudbury
Percolation Test
Form 12

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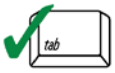

A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	5/12/2016			
Observation Hole #	SH-TP-408			
Depth of Perc	Top of Hole 74" Bottom of Hole 92"			
Start Pre-Soak	(00:00)			
End Pre-Soak	(15:00)			
Time at 12”	(15:00)			
Time at 9”	(24:16)			
Time at 6”	(34:15)			
Time (9”-6”)	(9:59)			
Rate (Min./Inch)	3.3 min/in			
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Eleanor Briggs (Soil Evaluator No. 13938)
Test Performed By:

Stephen Hallen (DEP)
Board of Health Witness

Comments:

9.5 gal. used in pre-soak

Commonwealth of Massachusetts
City/Town of Sudbury

Percolation Test

Form 12

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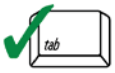

A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	5/12/2016			
Observation Hole #	SH-TP-411			
Depth of Perc	Top of Hole 41" Bottom of Hole 59"			
Start Pre-Soak	(00:00)			
End Pre-Soak	(10:53)			
Time at 12”				
Time at 9”				
Time at 6”				
Time (9”-6”)				
Rate (Min./Inch)	<2 min/in			
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Nell Briggs (Soil Evaluator No. 13938)
Test Performed By:

Stephen Hallem (DEP)
Board of Health Witness

Comments:

24 gal. used in pre-soak

Commonwealth of Massachusetts
City/Town of Sudbury

Percolation Test

Form 12

Percolation test results must be submitted with the Soil Suitability Assessment for On-site Sewage Disposal. DEP has provided this form for use by local Boards of Health. Other forms may be used, but the information must be substantially the same as that provided here. Before using this form, check with the local Board of Health to determine the form they use.

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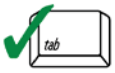


A. Site Information

Owner Name

528 Boston Post Road
Street Address or Lot #

Sudbury	MA	01776
City/Town	State	Zip Code

Contact Person (if different from Owner) | Telephone Number

B. Test Results

	Date	Time	Date	Time
	5/12/2016			
Observation Hole #	SH-TP-412			
Depth of Perc	Top of Hole 28" Bottom of Hole 46"			
Start Pre-Soak	(00:00)			
End Pre-Soak	(08:25)			
Time at 12”				
Time at 9”				
Time at 6”				
Time (9”-6”)				
Rate (Min./Inch)	<2 min/in			
	Test Passed: ☒ Test Failed: ☐		Test Passed: ☐ Test Failed: ☐	

Luke Norton (Soil Evaluator No. 13281) and Nell Briggs (Soil Evaluator No. 13938)
Test Performed By:

Stephen Hallem (DEP)
Board of Health Witness

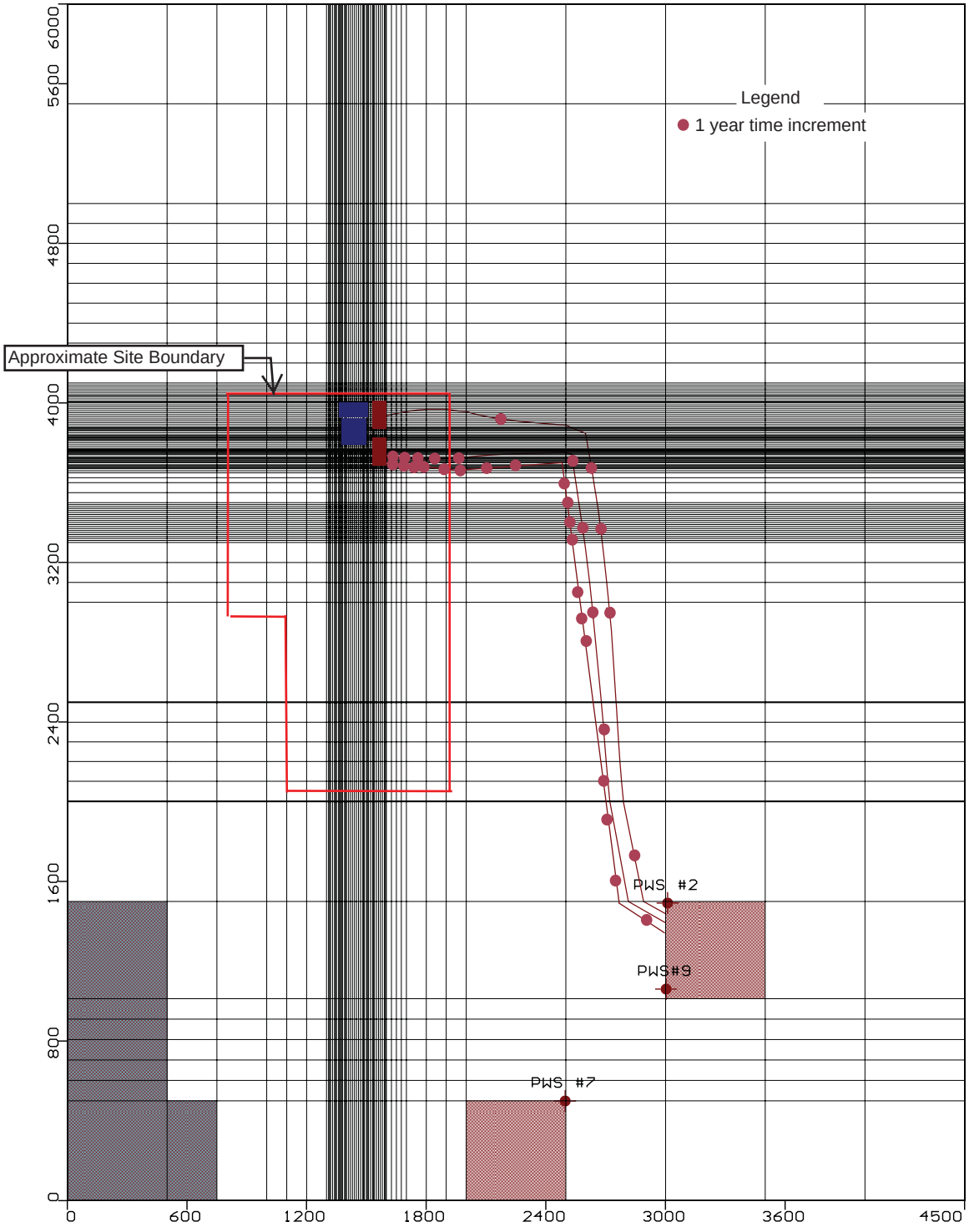
Comments:

24 gal. used in pre-soak

ATTACHMENT C

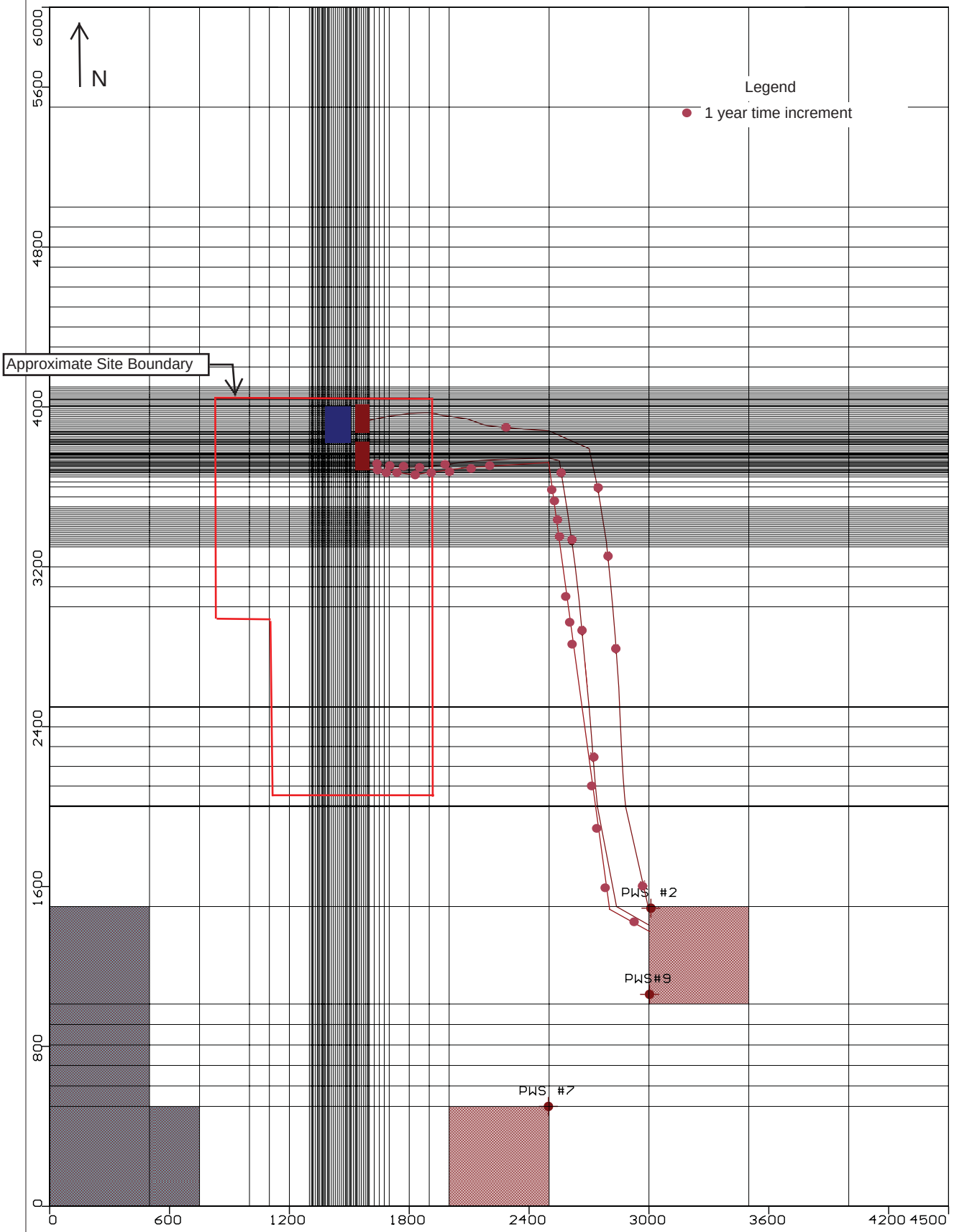
TIME TRAVEL ANALYSIS MODFLOW OUTPUT

Attachment C.1
Time Travel Analysis Existing Conditions
528 Boston Post Road Sudbury, MA



Notes:
Existing conditions:
10,000 gallons per day applied to Beds No.2 and No.3
with Bed 1 on Reserve

Attachment C.2
Time Travel Analysis Proposed Conditions
528 Boston Post Road Sudbury, MA



Notes:
Proposed conditions:
90,000 gallons per day applied to New Bed (22,500 square feet)
Bed No.2 on Reserve

Attachment 2

TATA & HOWARD

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NORTHEAST REGIONAL OFFICE
205B Lowell Street, Wilmington, MA 01887 • (978) 694-3200

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

IAN A. BOWLES
Secretary

LAURIE BURT
Commissioner

March 12, 2010

William J. Smey
Raytheon Company
528 Boston Post Road
Sudbury, MA 01776

RE: GROUNDWATER DISCHARGE PERMIT MODIFICATION NO. 23-4M
MassDEP Transmittal No. X231093 – Raytheon Company

Dear Mr. Smey:

In response to your application for a permit modification to discharge into the ground, treated effluent from the existing on-site wastewater treatment facility located at the Raytheon Company, 528 Boston Post Road, Sudbury, MA , and after due public notice, the MassDEP hereby issues the attached final permit. The public notice appeared in the Metrowest Daily News on February 4, 2010. The notice was also published in the Central Register of the Secretary of State on February 10, 2010.

No comments objecting to the issuance or terms of the permit were received by the Division of Wastewater Management during the public comment period. Therefore, in accordance with 314 CMR 2.08, the permit becomes effective upon issuance.

Parties aggrieved by the issuance of this permit are hereby advised of their right to request an Adjudicatory Hearing under the provision of Chapter 30A of the Massachusetts General Laws and 314 CMR 1.00, Rules for the Conduct of Adjudicatory Proceedings. Unless the person requesting the adjudicatory hearing requests and is granted a stay of the terms and conditions of the permit, the permit shall remain fully effective.

If you have any questions on any of the information discussed in this letter, please contact Kevin Brander of my staff at (978) 694-3236.

Sincerely,

Eric Worrall
Deputy Regional Director
Bureau of Resource Protection

Enclosure

cc:
-Sudbury Board of Health, 275 Old Lancaster Rd, Sudbury, MA 01776
-Marybeth Chubb, DEP/BRP/Watershed Permitting/Boston

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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Secretary

LAURIE BURT
Commissioner

GROUNDWATER DISCHARGE PERMIT

Name and Address of Applicant: **Raytheon Company, 528 Boston Post Road, Sudbury, MA 01776**

Date of Application: **December 15, 2009**

Application/Permit No. **X231093/23-4M**

Date of Issuance: **March 12, 2010**

Date of Expiration: **March 12, 2015**

Effective Date: **March 12, 2010**

AUTHORITY FOR ISSUANCE

Pursuant to authority granted by Chapter 21, Sections 26-53 of the Massachusetts General Laws, as amended, 314 CMR 2.00, and 314 CMR 5.00, the Massachusetts Department of Environmental Protection (the Department or MassDEP) hereby issues the following permit to: **Raytheon Company** (hereinafter called "the permittee") authorizing discharges to the ground from the on site wastewater treatment facility located at **Raytheon Company, 528 Boston Post Road, Sudbury, MA,** an industrial office complex, such authorization being expressly conditional on compliance by the permittee with all terms and conditions of the permit hereinafter set forth.

Eric Worrall, Deputy Regional Director
Bureau of Resource Protection

3/12/10
Date

I. SPECIAL CONDITIONS

A. Effluent Limits

The permittee is authorized to discharge into the ground from the wastewater treatment facilities for which this permit is issued a treated effluent whose characteristics shall not exceed the following values:

Effluent Characteristics	Discharge Limitations
Flow	50,000 gpd
Biochemical Oxygen Demand (BOD_5) (5 Day at 20°C)	30 mg/l
Total Suspended Solids (TSS)	10 mg/l
Nitrate Nitrogen	10 mg/l
Total Nitrogen (NO_2 + NO_3 + TKN)	10 mg/l
Turbidity	5 NTU
Oil & Grease	15 mg/l
Surfactants	1.0 mg/l
Fecal Coliform	200 colonies/100ml

a) The pH of the effluent shall not be less than 6.0 nor greater than 9.0 at any time or not more than 0.2 standard units outside the naturally occurring range.

b) The discharge of the effluent shall not result in any demonstrable adverse effect on the groundwater or violate any water quality standards that have been promulgated.

c) The monthly average concentration of BOD and TSS in the discharge shall not exceed 15 percent of the monthly average concentrations of BOD and TSS in the influent into the permittee's wastewater treatment facility.

d) When the average annual flow exceeds 80 percent of the permitted flow limitations, the permittee shall submit a report to the Department describing what steps the permittee will take in order to remain in compliance with the permit limitations and conditions, inclusive of the flow limitations established in this permit.

B. Monitoring and Reporting

1) The permittee shall monitor and record the quality of the **influent** and the quality and quantity of the **effluent** prior to discharge to the leaching facilities according to the following schedule and other provisions:

INFLUENT:

Parameter	Minimum Frequency of Analysis	Sample Type
BOD_5	Monthly	24-Hr. Composite
TSS	Monthly	24-Hr. Composite
Total Solids (TS)	Monthly	24-Hr. Composite
Ammonia Nitrogen	Monthly	24-Hr. Composite
Nitrate Nitrogen	Monthly	24-Hr. Composite
Volatile Organic Compounds (USEPA Method No. 624)	Semi-Annually	Grab

EFFLUENT:

Parameter	Minimum Frequency of Analysis	Sample Type
Flow	Daily	Reading Report Max-Min-Avg
pH	Daily	Grab
UV Intensity	Daily	Reading
BOD_5	Weekly	24-Hr. Composite
TSS	Weekly	24-Hr. Composite
TS	Monthly	24-Hr. Composite
Nitrate Nitrogen	Weekly	24-Hr. Composite
Ammonia Nitrogen	Weekly	24-Hr. Composite
Total Nitrogen (NO_2 + NO_3 + TKN)	Weekly	24-Hr. Composite
Turbidity	Daily	Reading
Oil & Grease	Monthly	Grab
Surfactants	Monthly	Grab
Fecal Coliform	Twice Weekly	Grab
Total Phosphorus*(as P)	Quarterly	Grab
Orthophosphate*(as P)	Quarterly	Grab
Copper**(as Cu)	Quarterly	Grab
Cadmium**(as Cd)	Quarterly	Grab
Mercury**(as Hg)	Quarterly	Grab
Zinc**(as Zn)	Quarterly	Grab
Volatile Organic Compounds (USEPA Method No. 624)	Semi-Annually	Grab

*After one full year of monitoring the Total Phosphorus and Orthophosphate results, MassDEP may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of MassDEP, the results of the sampling indicate that existing phosphorus levels will not adversely impact downgradient receptors.

**After one full year of monitoring the copper, cadmium, mercury and zinc results, MassDEP may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of MassDEP, the results of the sampling indicate that existing copper, cadmium and mercury levels will not adversely impact downgradient receptors.

2) The permittee shall sample the upgradient monitoring well, MW-7 and the downgradient monitoring wells MW-8 and MW-9, and also monitor, record and report the quality of water in the downgradient monitoring wells, MW #W-1 and MW #W-6; the cross gradient wells, MW #W-1 and MW #W-4 and the leach field wells, MW #W-3 and MW #W-5 as shown on the approved plan entitled *Installation of Wells and Groundwater Sampling, Sudbury facility, File No.W896*, prepared by The Geotechnical Group Inc. (TGG) and dated May 30, 1989. Labels identifying each monitoring well's identification in accordance with the above-referenced approved plan shall be affixed to the steel protective casing of each monitoring well.

The permittee shall monitor, record and report the quality of water in the monitoring wells according to the following schedule and other provisions:

Parameter	Minimum Frequency of Analysis
pH	Monthly
Static Water Level*	Monthly
Specific Conductance	Monthly
Nitrate Nitrogen	Quarterly
Total Nitrogen (NO_2 + NO_3 + TKN)	Quarterly
Total Phosphorus** (as P)	Quarterly
Orthophosphate** (as P)	Quarterly
Iron	Quarterly
Manganese	Quarterly
Sodium	Quarterly

Parameter(cont'd)	Minimum Frequency of Analysis(cont'd)
Aluminum	Quarterly
Copper***(as Cu)	Quarterly
Cadmium***(as Cd)	Quarterly
Mercury***(as Hg)	Quarterly
Zinc*** (Zn)	Quarterly
Volatile Organic Compound (US EPA Method #624)	Annually

* Static Water Level shall be expressed as an elevation and be referenced to the surveyed datum established for the site. It shall be calculated by subtracting the depth to the water table from the surveyed elevation of the top of the monitoring well's PVC well casing/riser.

** After one full year of monitoring the Total Phosphorus and Orthophosphate results, MassDEP may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of MassDEP, the results of the sampling indicate that existing phosphorus levels will not adversely impact downgradient receptors.

*** After one full year of monitoring the copper, cadmium, mercury and zinc results, MassDEP may determine, upon the request of the permittee, that the frequency of monitoring may be reduced if, in the judgment of MassDEP, the results of the sampling indicate that existing copper, cadmium and mercury and zinc levels will not adversely impact downgradient receptors.

3) Any grab sample or composite sample required to be taken less frequently than daily shall be taken during the period of Monday through Friday inclusive. All composite samples shall be taken over the operating day.

The permittee shall submit all monitoring reports within 30 days of the last day of the reporting month. Reports shall be on an acceptable form, properly filled and signed and shall be sent to: the Deputy Regional Director, Bureau of Resource Protection, Department of Environmental Protection, Northeast Regional Office, 205B Lowell Street, Wilmington, MA 01887 and to the Program Director, Watershed Permitting, Bureau of Resource Protection, Department of Environmental Protection, One Winter Street/5th Floor, Boston, MA 02108, and to the Board of Health, 278 Old Sudbury Road, Sudbury, MA 01776.

Submission of monitoring reports in electronic format is available through eDEP and serves as data submission to both the Regional and Boston offices. To register for electronic submission go to:
http://www.mass.gov/dep/service/compliance/edeponlf.htm

C. Supplemental Conditions

1) The permittee shall notify the Department at least thirty (30) days in advance of the proposed transfer of ownership of the facility for which this permit is written. Said notification shall include a written agreement between the existing and new permittees containing a specific date for transfer of permit, responsibility, coverage and liability between them.

2) A staffing plan for the facility shall be submitted to the Department once every two years and whenever there are staffing changes. The staffing plan shall include the following components:

   a) The operator(s)'s name(s), operator grade(s) and operator license number(s);
   b) The number of operational days per week;
   c) The number of operational shifts per week;
   d) The number of shifts per day;
   e) The required personnel per shift;
   f) Saturday, Sunday and holiday staff coverage;
   g) Emergency operating personnel

3) The permittee is responsible for the operation and maintenance of all sewers, pump stations, and treatment units for the permitted facility, which shall be operated and maintained under the direction of a properly certified wastewater operator.

4) Operation and maintenance of the proposed facility must be in accordance with 314 CMR 12.00, "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges", and, 257 CMR 2.00, "Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities.

   a) The facility has been rated (in accordance with 257 CMR 2.00), to be a Grade 4 facility. Therefore, the permittee shall provide for oversight by a Massachusetts Certified Wastewater Treatment plant operator (Chief Operator) Grade

4 or higher. The permittee will also provide for a backup operator who shall possess at least a valid Grade 3 license.

b) The date and time of the operator's inspection along with the operator's name and certification shall be recorded on the required monthly monitoring reports.

5) If the operation and maintenance of the facility is to be contracted to a private concern, the permittee shall submit a copy of the contract, consistent with what is required by the approved Operation & Maintenance manual and signed only by the contractor, to the appropriate MassDEP Regional Office for review and approval ninety (90) days **prior** to the start up of the facility. Along with the contract, a detailed listing of all contract operation obligations of the proposed contractor at other facilities shall also be submitted. The permittee shall not begin operation of the treatment facility until the Department approves the contract.

6) Any additional connections to the sewer system, beyond the existing system servicing the industrial office complex, shall be approved by MassDEP and the local Board of Health prior to the connection.

7) All tests or analytical determinations to determine compliance with permit standards and requirements shall be done using tests and procedures found in the most recent version of *Standard Methods for the Examination of Water and Wastewater* and shall be performed by a Massachusetts Certified laboratory.

8) The permittee shall notify the appropriate MassDEP Regional Office, in writing, within 24 hours of the following events:

a) The date of treatment plant start up.
b) Any interruption of the treatment system operation, other than routine maintenance.
c) Final shutdown of the treatment system.

9) The permittee shall contract to have any and all solids and sludges generated by the treatment system for which this permit is issued removed off site by a properly licensed waste hauler for disposal at an EPA/MassDEP approved facility. The name and license number of the hauler along with the quantity of wastes removed and the date(s) of

removal shall be reported by the permittee in writing to the appropriate MassDEP Regional Office.

10) In the event that effluent limits are not met, or the groundwater quality in the down-gradient monitoring wells does not meet the groundwater quality standards for Class I groundwaters, the permittee may be obligated to modify, supplement or replace the permitted treatment process so as to ensure compliance with the groundwater quality standards.

D. Appeal Rights

This Permit is an action of the Department. Any person aggrieved by this action, may request an Adjudicatory Hearing. A request for a hearing must be made in writing and postmarked within thirty (30) days of the Permit issuance date. Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought.

The Hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars ($100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

The request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority. The Department may waive the adjudicatory hearing filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

II. GENERAL PERMIT CONDITIONS (314 CMR 5.16)

(1) No discharge authorized in the permit shall cause or contribute to a violation of the Massachusetts Surface Water Quality Standards (314 CMR 4.00) or any amendments thereto. Upon promulgation of any amended standard, this permit may be revised or amended in accordance with such standard and 314 CMR 2.10 and 3.13 or 5.12. Except as otherwise provided in 314 CMR 5.10 (3)(c), 310 CMR 5.10(4)(a)2 and 314 CMR 5.10(9), no discharge authorized in the permit shall impair the ability of the ground water to act as an actual or potential source of potable water. Evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water includes, without limitation, analysis of samples taken in a downgradient well that shows one or more exceedances of the applicable water quality based effluent limitations set forth in 314 CMR 5.10. In those cases where it is shown that a measured parameter exceeds the applicable water quality based effluent limitations set forth in 314 CMR 5.10 at the upgradient monitoring well, evidence that a discharge impairs the ability of the ground water to act as an actual or potential source of potable water is deemed to exist if a measured parameter in any downgradient well exceeds the level of that same measured parameter in the upgradient well for the same sampling period. A statistical procedure approved by the Department shall be used in determining when a measured parameter exceeds the allowable level.

(2) Duty to comply. The permittee shall comply at all times with the terms and conditions of the permit, 314 CMR 5.00, M.G.L. c. 21, §§ 26 through 53 and all applicable state and federal statutes and regulations.

(3) Standards and prohibitions for toxic pollutants. The permittee shall comply with effluent standards or prohibitions established under § 307(a) of the Federal Act, 33 U.S.C § 1317(a), for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

(4) Proper operation and maintenance. The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to achieve compliance with the terms and conditions of the permit, and the regulations promulgated at 314

CMR 12.00 entitled "Operation and Maintenance and Pretreatment Standards for Wastewater Treatment Works and Indirect Discharges, and 257 CMR 2.00, Rules and Regulations for Certification of Operators of Wastewater Treatment Facilities".

(5) Duty to halt or reduce activity. Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or discharges or both until the facility is restored or an alternative method of treatment is provided. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

(6) Power Failure. In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

(a) provide an alternative power source sufficient to operate the wastewater control facilities; or

(b) halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

(7) Duty to mitigate. The permittee shall take all reasonable steps to minimize or prevent any adverse impact on human health or the environment resulting from non-compliance with the permit.

(8) Duty to provide information. The permittee shall furnish to the Department within a reasonable time as specified by the Department any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine whether the permittee is complying with the terms and conditions of the permit.

(9) Inspection and entry. The permittee shall allow the Department or its authorized representatives to:

(a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records required by the permit are kept;

(b) Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;

(c) Inspect at reasonable times any facilities, equipment, practices, or operations regulated or required under the permit; and

(d) Sample or monitor at reasonable times for the purpose of determining compliance with the terms and conditions of the permit.

(9A) The permittee shall physically secure the treatment works and monitoring wells and limit access to the treatment works and monitoring wells to those personnel required to operate, inspect and maintain the treatment works and to collect samples.

(9B) The permittee shall identify each monitoring well by permanently affixing to the steel protective casing of the well a tag with the identification number listed in the permit.

(10) Monitoring. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Monitoring must be conducted according to test procedures approved under 40 CFR Part 136 unless other test procedures are specified in the permit.

(11) Recordkeeping. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and all records of all data used to complete the application for the permit, for a period of at least three years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time. Records of monitoring information shall include:

(a) The date, exact place, and time of sampling or measurements;

(b) The individual(s) who performed the sampling or measurement;

(c) The date(s) analyses were performed;

(d) The individual(s) who performed the analyses;

(e) The analytical techniques or methods used; and

(f) The results of such analyses.

(12) Prohibition of bypassing. Except as provided in 314 CMR 5.16(13), bypassing is prohibited, and the Department may take enforcement action against a permittee for bypassing unless:

(a) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
(c) The permittee submitted notice of the bypass to the Department:

1. In the event of an anticipated bypass, at least ten days in advance, if possible; or
2. In the event of an unanticipated bypass, as soon as the permittee has knowledge of the bypass and no later than 24 hours after its first occurrence.

(13) Bypass not exceeding limitations. The permittee may allow a bypass to occur which does not cause effluent limitations to be exceeded, but only if necessary for the performance of essential maintenance or to assure efficient operation of treatment facilities.

(14) Permit actions. The permit may be modified, suspended, or revoked for cause. The filing of a request by the permittee for a permit modification, reissuance, or termination, or a notification of planned changes or anticipated non-compliance does not stay any permit condition.

(15) Duty to reapply. If the permittee wishes to continue an activity regulated by the permit after the expiration date of the permit, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department in writing.

(16) Property rights. The permit does not convey any property rights of any sort or any exclusive privilege.

(17) Other laws. The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, and local laws and regulations.

(18) Oil and hazardous substance liability. Nothing in the permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities,

liabilities, or penalties to which the permittee is or may be subject under § 311 of the Federal Act, 33 U.S.C. § 1321, and M.G.L. c. 21E.

(19) Removed substances. Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed in a manner consistent with applicable Federal and State laws and regulations including, but not limited to, the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 and the Federal Act, , 33 U.S.C. § 1251 *et seq*, the Massachusetts Hazardous Waste Management Act, M.G.L. c. 21C, and the Federal Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.*, 310 CMR 19.000 and 30.000, and other applicable regulations.

(20) Reporting requirements.

(a) Monitoring reports. Monitoring results shall be reported on a Discharge Monitoring Report (DMR) at the intervals specified elsewhere in the permit. If the permittee monitors any pollutant more frequently than required by the permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

(b) Compliance schedules. Reports of compliance or non-compliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date.

(c) Planned changes. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility or activity which could significantly change the nature or increase the quantity of pollutants discharged. Unless and until the permit is modified, any new or increased discharge in excess of permit limits or not specifically authorized by the permit constitutes a violation.

(d) Anticipated non-compliance. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in non-compliance with permit requirements.

(e) 24 hour reporting. The permittee shall report any non-compliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a

description of the non-compliance, including exact dates and times, and if the non-compliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the non-compliance. The following shall be included as information which must be reported within 24 hours:

1. Any unanticipated bypass which exceeds any effluent limitation in the permit.

2. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit to be reported within 24 hours.

(f) Other non-compliance. The permittee shall report all instances of non-compliance not reported under 314 CMR 5.16(20)(a), (b), or (e) at the time monitoring reports are submitted. The reports shall contain the information listed in 314 CMR 5.16(20)(e).

(g) Toxics. All manufacturing, commercial, mining, or silvicultural dischargers must notify the Department as soon as they know or have reason to believe:

1. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant listed in 314 CMR 3.17 which is not limited in the permit, if that discharge will exceed the highest of the following notification levels:

   a. 100 micrograms per liter (100 ug/l);

   b. 200 micrograms per liter (200 ug/l) for acrolein and acrylonitrile; 500 micrograms per liter (500 ug/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony;

   c. Five times the maximum concentration value reported for that pollutant in the permit application; or

2. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

(h) Indirect dischargers. All Publicly Owned Treatment Works shall provide adequate notice to the Department of the following:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to § 301 or 306 of the Federal Act, 33 U.S.C. § 1311 or 1316, if it were directly discharging those pollutants; and

2. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.

(i) Information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

(21) Signatory requirement. All applications, reports, or information submitted to the Department shall be signed and certified in accordance with 314 CMR 3.15 and 5.14.

(22) Severability. The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.

(23) Reopener clause. The Department reserves the right to make appropriate revisions to the permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 or the Federal Act, 33 U.S.C. §1251 *et seq* in order to bring all discharges into compliance with said statutes.

(24) Approval of treatment works. All discharges and associated treatment works authorized herein shall be consistent with the terms and conditions of this permit. Any modification to the approved treatment works shall require written approval of the Department prior to the construction of the modification.

(25) Transfer of Permits.

(a) RCRA facilities. Any permit which authorizes the operation of a RCRA facility which is subject to the requirements of 314 CMR 8.07 shall be valid only for the person to whom it is issued and may not be transferred.

(b) Transfers by modification. Except as provided in 314 CMR 5.16(25)(a) and (c), a permit may be transferred by the permittee to a new owner or operator provided that the permit has been modified or revoked and reissued or a minor modification is made to identify the new permittee in accordance with 314 CMR 5.12(3) and (4).

(c) Automatic transfers. For facilities other than Privately Owned Wastewater Treatment Facilities (PWTFs) that treat at least some sewage from residential uses, hospitals, nursing or personal care facilities, residential care facilities, and/or assisted living facilities, PWTFs that have been required to establish financial assurance

mechanism(s) pursuant to 314 CMR 5.15(6), and RCRA facilities subject to the requirements of 314 CMR 8.07, a permit may be automatically transferred in accordance with 314 CMR 5.12(5).

(26) Permit Compliance Fees and Inspection Information. Except as otherwise provided, any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, § 43 and 314 CMR 3.00 and 5.00, shall be required to submit the annual compliance assurance fee established in accordance with M.G.L. c. 21A, § 18 and 310 CMR 4.00 as provided in 314 CMR 2.12. The requirement to submit the annual compliance fee does not apply to any local government unit other than an authority. Any permittee required to obtain a surface water or ground water discharge permit pursuant to M.G.L. c. 21, §43 and 314 CMR 3.00 and 5.00 may be required to submit inspection information annually as a condition of the permit as provided in 314 CMR 2.12.