

GH-2

COMMITMENT & INTEGRITY
DRIVE RESULTS

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July 31, 2008

COPY

Ms. Margo Webber
Department of Environmental Protection
Central Regional Office
Bureau of Resource Protection
627 Main Street
Worcester, MA 01608

RECEIVED

AUG 11 2008

ACTON BOARD OF HEALTH

RE: Acton-GW#0-065-T#W003143
Wetlands Monitoring Report

Dear Ms. Webber:

As required under Special Conditions, Item C - Supplemental Conditions of the Groundwater Discharge Permit for the Acton Wastewater Treatment Facility (WWTF), permit Acton-GW#0-065-T#W003143 issued April 12, 2005, this wetlands determination report has been prepared and submitted for your review and approval. The original baseline wetland determination was submitted on December 14, 2001 and was intended to form the basis for future comparison; however given the large scale changes to the riverfront area discussed below we do not recommend that a direct wetland comparison be made at this time.

The WWTF site is a 35-acre town owned parcel located on Adams Street, adjacent to the Assabet River. The facility is designed to provide tertiary treatment with effluent discharge from the facility to rapid infiltration basins (RIBs) which occupies approximately six acres. The RIBs consists of six constructed earthen dike basins that are used to contain and infiltrate the treated wastewater effluent. The RIBs are the groundwater discharge system for the WWTF.

Wetlands Determination

Prior to construction of the Acton WWTF a detailed wetlands determination was performed as required by the Town of Acton Conservation Commission Order of Conditions. As part of this delineation the following limits were determined, reviewed and accepted by the Town's natural Resources Agent. All of these limits are shown on the attached Figure 1:

- Limit of Wetlands
- 100 foot wetland buffer zone
- 100 year flood plain boundary for the Assabet River
- 200 foot riverfront protection act buffer for the Assabet River



Once these limits were established, appropriate erosion control barriers, siltation barriers, and drainage channels with rip rap swales and aprons were incorporated into the construction documents in order to protect and maintain the buffers and the wetland species. The design and layout of the facility was prepared in a fashion that does not require soil disturbance within 25 feet of a wetland, and does not place a structure within 40 feet of a wetland. A portion of the WWTF lies within 200 feet of the Assabet River. The project was exempt from the River Protection Act, Riverfront Area under 310 CMR 10.58 (6)(h) because it is a municipal WWTF. A vernal pool was identified on the Adams Street site approximately 600 feet to the west of the WWTF building. This pool was determined to be hydraulically separate and not at risk by the National Heritage and Endangered Species Program due to its distance from the proposed construction zone.

Construction of the WWTF began in March 2000 and was completed in September 2001. The treatment building and its associated excavation, backfilling, and piping required approximately two acres of soil disturbance but no wetlands disturbance or replication. The areas of soil disturbance have long been stabilized and landscaped. At this point mature growth exists on all sloped above wetlands.

The Limit of Wetlands prior to construction remains in place, undisturbed during construction. A portion of the wetlands flags used to identify the limits in late 1997 and since the baseline Wetland determination in 2001 remain in place around the base of the facility site slopes and the RIBs slopes as well as along the stream that separates the parcel.

Determination Protocol

As required under the Supplemental Conditions, a baseline wetlands determination report was to be submitted to the Massachusetts Department of Environmental Protection (MassDEP) on an annual basis following the initiation of operation. An original course of action was included in the 2001 Baseline Report to comply with this requirement. It included having the Town of Acton Natural Resource Agent or a town selected consultant walking the limit of the wetlands (slopes and stream bank) and re-flag the limit based upon wetland criteria (hydricsoils, etc.). Any areas of possible wetland migration were to be flagged and reinvestigated in the summer months when vegetation may be used as an identifying method. A baseline of the limits of wetlands and the types of wetlands (blueberry bushes, skunk cabbage, etc.) were to be prepared by the Town of Acton Natural Resource Agent or the town selected consultant. The baseline would be used for the comparison of wetlands types and the following general protocol was to be followed:

- The flags shall be labeled with a year and tied at approximately 200 foot intervals, or more frequently where necessary.
- The annual wetlands determination report shall note any significant deviations in the limit from previous years. If the deviations are significant the annual report shall include an assessment of the following:
 - Type of wetland species
 - Approximate distance / area of change
 - Potential causes of change
 - Potential actions to mitigate the change, if necessary, as determined by the MassDEP and the Acton Conservation Commission



High Street Dam Remains in Failure

In April 2004 there was structural failure of the dam at the Old High Street Power Station adjacent to the WWTF and RIBs site, causing a release of the Assabet River over the dam, a significant lowering of the river elevation, and an emptying of the impoundment adjacent to the site. Dam repairs began in fall 2007 however have not progressed to the point where the spillway elevation has been raised to allow the impoundment to reflood to previous water level elevations.

The empty impoundment continues to give the opportunity to observe additional elevations and slopes, which are typically under water. There is now some 30 to 40 feet of previously vegetated wetland bank and some 40 to 50 feet of dry reservoir bottom visible and travelable in the area between the RIBs and the river. This opportunity provides valuable input into the annual Slope Stability Monitoring Reports; however, the limits of wetlands and the nature and quality of the wetland species within the 100 foot wetland buffer zone, 100 year flood plain boundary, and the 200 foot riverfront protection act buffer for the Assabet River. There has been a significant change to the Limit of Wetlands, independent of the any RIBs discharge, emergent groundwater or breakout making a routine comparison to the 2001 baseline effort difficult.

2008 Site Walk

On July 31, 2008, Woodard & Curran made a field visit to the WWTF and RIBs site with the Acton Natural Resources Agent to perform the annual wetland monitoring along the Assabet River. The weather was hot, at 85 degrees, and there had been rain the prior evening. The protocol for the annual monitoring field effort duplicated that which has been done each year since 2005.

The area south of the WWTF site was walked first. The overstory canopy remained healthy with oak and red maple. White ash die-back continues and actually appears to have accelerated, but that is attributed to disease in the white ash population and not the WWTF or its operations. The slopes to the rivers edge are a mixture of native grasses. The slopes have some mature invasive species such as European buckthorn and multi flora rose. The lower area along the former impoundment grows as a full sun marsh. The formerly submerged area is now colonized by swamp maple, grown to 6 feet in height, and the non-native purple loosestrife. The fragmite (nonnative invasive) and cat tale (native) populations appeared in similar density as 2007. The wetlands south of the WWTF building show no sign of erosion or impact from the WWTF site.

In the area south of the RIBs site the overstory canopy in the uplands are healthy with oak and white pine. White ash die-back continues on this portion of the site as well. The understory in the uplands area is dense with summer sweet and other native vegetation. Sumac and buckthorn have matured and fully colonized the slopes. The lower area along the former impoundment is similar to that below the WWTF site in that it remains a full sun marsh colonized by swamp maple, and purple loosestrife. The wetlands south of the Ribs site show no sign of erosion or impact from the RIBs site.

Conclusions

As with the previous several annual reports, the wetlands around the Acton WWTF and RIBs sites shown no indication of changes. The slopes are stabilized by upland species such as buckthorn and sumac and show no sign of wet species moving into the slopes.

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August 4, 2008



Mr. Fred Connarn, Project Manager
Methuen Construction Co., Inc.
40 Lowell Road
Salem, NH 03079

RE: Certificate of Substantial & Final Completion
Letchworth Avenue WWTF Rotary Press Feed Pumps Replacement
Town of Billerica, MA

Dear Mr. Connarn:

Enclosed is one (1) original of the Executed Certificate of Substantial Completion and one (1) original of the Executed Certificate of Final Completion for the Letchworth Avenue WWTF Rotary Press Feed Pumps Replacement for your project records.

If you have any questions please feel free to call me at 781-251-0200.

Sincerely,

WOODARD & CURRAN, INC.

Thomas F. Hazlett, P.E.
Project Manager

TFH/ljs
Project 210092.04

Enclosures

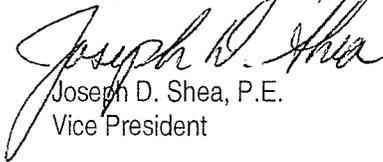
Cc: Abdul Alkhatib, Town of Billerica, w/o enclosure
Lorraine Sander, Town of Billerica, w/o enclosure



We look forward to your review and comments on this Wetlands Monitoring Report and we are available to discuss any issues. If you have any questions regarding this document or the Acton WWTF please do not hesitate to contact me at 781-251-0200.

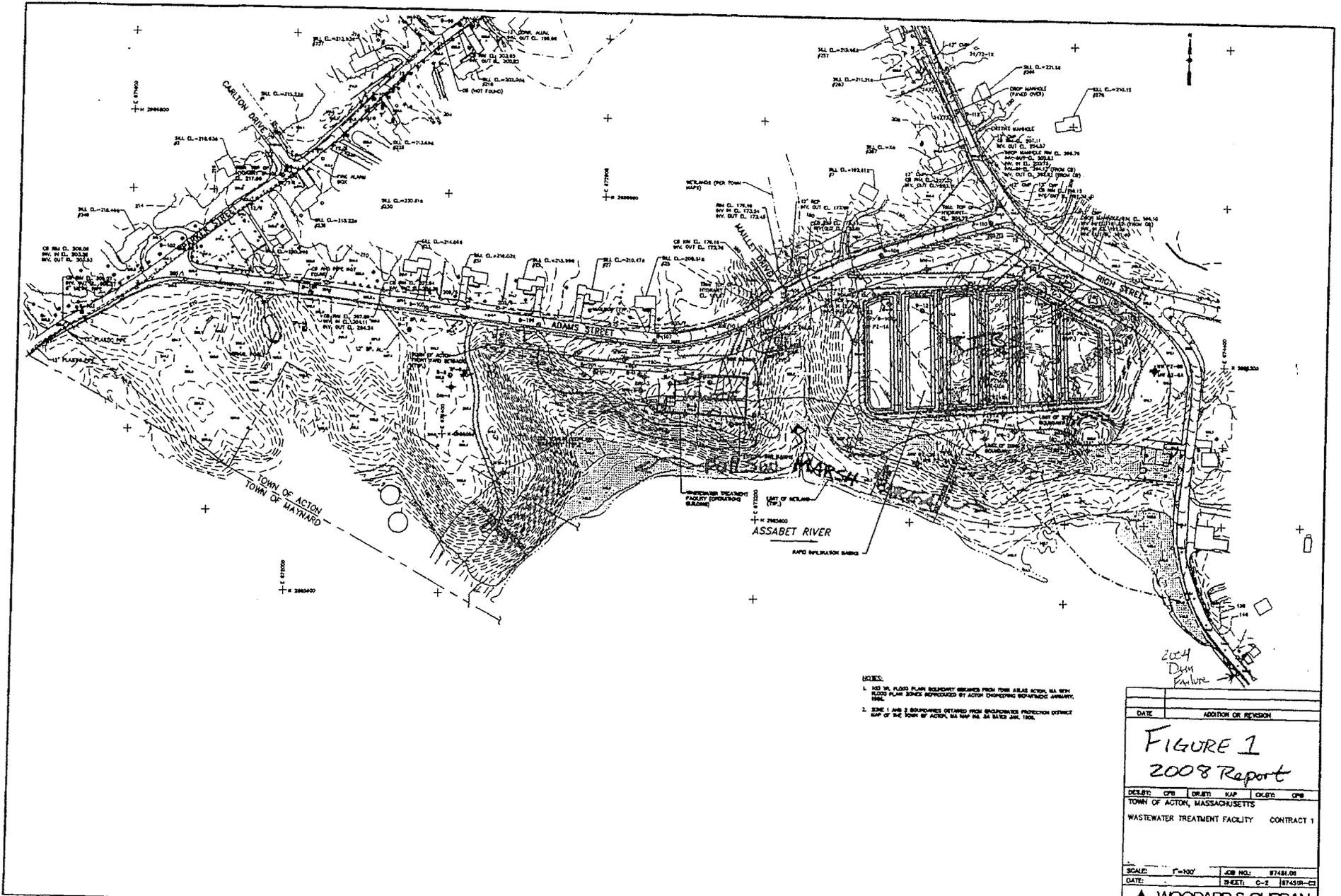
Very truly yours,

WOODARD & CURRAN, INC.


Joseph D. Shea, P.E.
Vice President

Attachment: Figure 1

cc: Doug Halley, Director of Health, Acton
Tom Tidman, Natural Resource Agent, Acton
· Bill Luksha, Area Manager, Woodard & Curran
· John Parkhurst, Acton Plant Manager, Woodard & Curran



- NOTES:
1. NO. 10 FLOOD PLAN BOUNDARY DERIVED FROM THE ASHES ACTON, MA 1974 FLOOD PLAN BOUNDARY REPRODUCED BY ACTON ENGINEERING BOARD/NO. 10 JANUARY, 1984.
 2. ZONE 1 AND 2 BOUNDARIES OBTAINED FROM BROOKFIELD PROTECTION DISTRICT MAP OF THE TOWN OF ACTON, MA MAP NO. 24 BATES JAN. 1984.

*2004
Dam
failure*

DATE	ADDITION OR REVISION
FIGURE 1	
2008 Report	
DESIGN: CFB	DRAWN: MAP
CHECKED: CFB	DATE: 08/08
TOWN OF ACTON, MASSACHUSETTS	
WASTEWATER TREATMENT FACILITY CONTRACT 1	
SCALE: 1"=100'	JOB NO.: 87481-08
DATE: 8-22-08	DATE: 8-22-08
WOODARD & CURRIAN Engineering, Science, Construction	



November 14, 2008

Ms. Margo Webber
Department of Environmental Protection
Central Regional Office
Bureau of Resource Protection
627 Main Street
Worcester, MA 01608

RE: Acton-GW#0-656-T#W003143
Acton Wastewater Treatment Facility
2008 Annual Slope Stability & Erosion Report

Dear Ms. Webber:

As required under the Supplemental Conditions of the Groundwater Discharge Permit for the Acton Wastewater Treatment Facility (WWTF), permit Acton-GW#0-656-T#W003143 issued April 12, 2005, this annual slope stability and erosion report has been prepared and submitted for your review and approval in accordance with Supplemental Condition 5. This report is the seventh annual report. It utilizes the baseline report dated December 7, 2001 as the basis for discussion and comparison and builds upon the six previous annual reports submitted annually since 2001. Each Annual Report was performed by the same Hydrogeologist who had performed the baseline report.

The WWTF site is a 35-acre, town-owned parcel located on Adams Street, adjacent to the Assabet River. The WWTF is a sequencing batch reactor (SBR) treatment facility with effluent discharge to a rapid infiltration basin (RIB) system. The RIBs consist of six (6) constructed earthen dike basins, totaling approximately six (6) acres, which are used to contain and infiltrate the treated wastewater effluent under the provisions of the groundwater discharge permit.

As part of the original construction, concluded in the winter of 2001-02, the natural topography of the site was forested and sloped toward the Assabet River during modifications to accommodate the WWTF building and the RIB system. Those modifications included the construction of 2:1 slopes and 1.5:1 slopes with stability protection measures, such as jute netting. The Baseline Report detailed slope stabilization measures employed during construction and the subsequent annual reports detailed the slope inspections along the river and stream side slopes of the RIBs. The slope inspection procedures used since the baseline have mirrored the system utilized on all of the previous reports to allow for ease in comparing the conditions. In addition, the operators have been making notations about slope and vegetation characteristics during their weekly, monthly, and quarterly sampling of the monitoring wells (MW), piezometers (PZ) and surface waters. When emergent groundwater (GW) and/or puddling is observed, the limits of the liquid is staked and noted to determine change in the volume and location of the liquid.



Conclusions from Previous Inspections and Reports

Design documents from 1997 indicated that wet areas were evident on the fringe just above the river level. The 1998 Hydrogeologic Model and Report for the RIBs site indicated that emergent groundwater was to be expected in select locations under design flow conditions. The 2001 baseline inspection did not note any evidence or suggestion of groundwater emergence along the Assabet River slopes of the RIBs. This condition was re-observed in the 2002 inspection, which noted the groundwater near the surface and soils with no shear strength around contour 150 within the 200 feet of the river, but well outside the limits of the new slope construction. However, year 2001 was quite dry while 2002 was normal; therefore it was difficult to know if the wet areas noted at that time were a product of the return to normal precipitation.

The 2002 slope inspection did not identify any unexpected changes in stability, soil condition, or groundwater activity. The 2001 baseline inspection indicated that the unnamed stream between the WWTF and the RIBs site progressively gained flow as it came southward down the ravine away from Adams Street. This suggested that the stream was gaining water from groundwater emerging to the streambed, which was confirmed in the 2002 inspection that noted emergent groundwater at the toe of a break in slope along the stream bed.

The 2003 slope inspection found no change in the artificial slopes, which were graded and maturely vegetated by this time, with the exception of the new emergent groundwater near PZ-12A. The vegetation was well established and no erosion or slumping was evident. There were more locations with emergent groundwater and saturated, low strength soils than had been observed during previous inspections; however, the locations were as expected from the 1998 Hydrogeologic Model and Report. The conclusions from the 2003 report were that groundwater had risen to elevation 160 feet near PZ-12A and along the east bank of the unnamed stream. As expected, increased flows were noted at previous groundwater sites, which are at lower elevations (150 feet at GW#1 and GW#2). As part of the 2003 conclusions, the WWTF operators modified procedures to rotate the effluent discharge to the RIBs on a bi-weekly basis to even the flows to all RIBs.

The 2004 slope inspection found no significant change in the artificial slopes which were graded and grassed as part of the RIBs construction. There were two new locations with emergent groundwater and one area of expanded groundwater presence. The Assabet River impoundment adjacent to the site was empty due to the release of the dam at the Old High Street power station which allowed an opportunity to observe additional elevations and slope along the banks, which are typically under water. The emergent groundwater was evident in areas as seen in past inspections. The 2004 report concluded with the determination that the RIBs site was acting within expectations and well within the modeled performance from 1998.

The 2005 slope inspection identified emergent groundwater was still evident in areas as seen in the past inspections but none of the artificially graded and grassed surfaces near the RIBs show any signs of emergent groundwater causing slumping or failure. West of the RIBs, along the unnamed brook, areas of emergent groundwater seemed to be growing such that they are starting to blend and become one large area of emergent groundwater and saturated soils with the surface flow reaching the stream. The project area along the former river bank at about elevation 150 was still receiving groundwater to the extent that it is caused to emerge on the ground surface. The exceptional amount of precipitation in October 2005 may have skewed the field observations therefore locations were marked for future review.



The 2006 slope inspection was actually performed in April 2007, outside of the typical November timeframe for field work due to a desire to utilize the same Hydrogeologist who had performed the baseline and other annual reports. This spring time field visit and report yielded a different perspective on the groundwater activities and, we feel, more depth to the discussion. As expected the spring time site visit, found few notable changes in the artificial slopes which were graded and grassed as part of the RIBs construction; however, given the time of year in which this inspection was performed, natural annual groundwater issues were difficult to separate from possible effluent induced issues. There were new locations with emergent groundwater and areas of expanded groundwater presence, which were marked in the field for review in November 2007. The Assabet River impoundment adjacent to the site remained empty due to the release of the dam at the Old High Street Power Station and was fully vegetated. Even with this out-of-cycle snapshot of groundwater activity at the RIBs site, it appears that the RIBs site was acting within expectations.

The 2007 slope inspection report was submitted to DEP in a letter dated January 15, 2008 and had the site walk performed in the month of November as has been the target since the 2001 Baseline Report. The 2007 annual slope inspection found few notable changes from the previous year's inspection. Emergent groundwater was less evident and in smaller flow amounts than were noted in previous years, which was attributed to dryer conditions in the fall of that year. There were no new locations with emergent groundwater only areas of expanded groundwater presence. The artificial slopes, which were graded and grassed as part of the RIBs construction, remained stable and vegetative cover increased. The Assabet River impoundment adjacent to the site also began to reform with the dam repairs having been completed.

Details from the Current Slope Inspection

On the afternoon of October 30, 2008, Woodard & Curran made a field visit to the Acton WWTF RIBs site. The purpose was to perform the annual inspection of the land area down slope from the RIBs, between the Assabet River and the RIBs, and around the WWTF site.

The weather was sunny and the temperature was moderate (55 degrees). There was no standing effluent in the RIBs which appear to not have received discharge yet on that day. The RIBs were well groomed with a disk harrow, however windows of soils not previously observed were noted for the first time in the bottom of the RIBs. The man made depression located just east of RIB #6 which was noted in the 2007 Report, was no longer there and volunteer growth since the 2007 inspection has fully obscured signs of the former detention area.

The dam on Old High Street which had failed and released the impoundment in 2004 has been reconstructed and the embayment at the base of the sites is again holding water.

In some previous inspections there have been large pools of standing water around PZ12a and often these pools have shown flow and obvious movement of water. In contrast, this date there was no standing water or pools of any kind.

However, soils in the area of PZ-12a and at locations of former pools was oversaturated and had no shear strength to heel pressure.



Consistent with the previous inspections, we began the field reconnaissance in the area near MW #4 and **PZ-12A**, at the southeast corner of the RIBS. As expected the grassed slope in this area was firm and dry at the toe of slope. In a previous inspection, the area around PZ-12A had been an area of standing water and demonstrated flow and obvious movement of water, while during the October 2008 inspection there was no standing water. However, the soils in that area were oversaturated and had no shear strength to heel pressure.

The traverse continued west along the 150 -160 ft elevation contour at the location of **GW-5** there is standing water. The point of emergence remains at the "head water stake" as previously located. The stake and a bush branch nearby were re-flagged and dated with pink flagging. The trace of the standing water and groundwater emergence is from the stake S10°E similar to previous observations. The trace of emerged groundwater continues down slope for 85 feet with a dogleg to the right (S10°W at 44 ft.) and the water re-infiltrates to the ground 15 feet before reaching the full shoreline of the former Fort Pond. Soil along the seepage trace is over saturated with no shear resistance to heel pressure. However, there is no movement of the water visible in the trace until 50 feet down slope from the staked point of emergence (POE). Up slope of the point of observed movement, water is simply standing on leaves and collected onto the ground surface. The observed water movement is very slow, little more than a seep, about 0.25 gallons per minute (gpm). There is no evidence of transported sediment in the trace of GW-5.

GW-6 was still marked and present at the same POE. It is a small seep with no visible flow and water simply standing on surface. The line of seepage is about 18 inches wide and runs S20°E for 75 feet until the water re-infiltrated about 20 feet up hill from the shoreline.

Much of the slope immediately west of GW-6 (15 – 20 feet) is over saturated with no shear strength to resist heel pressure.

GW-10 is located at the same POE however there is no pool of standing water. The area of weak soils with no resistance to heel pressure is about 40' N-S and 30' E-W.

GW-20 is at the same POE as staked previously on previous inspections. It is an area of about 12'x 15' (East-West) of soils with no heel resistance to shearing.

GW-21 is at the same POE as previously flagged. There is no pool of standing water however the area of about 5'x 10' is over saturated soils with no resistance to shear under heel pressure.

GW-22 is at the same location as previously flagged. There is no pool of standing water, only the area of low strength soil which shears easily under heel pressure. This area is located within a thick path of greenbriars.

GW-23 is a small pool of standing water (25'x6') emerging at the same stake as located in previous years. It shows no evidence of flow on this date. It is located near a large (12'x16') boulder. Soils for a 5 foot fringe around the pool are over saturated with no shear strength resistance to heel pressure.

West of GW-23 there is a large area of standing water as has been noted on previous inspections. It is about 50' N-S x 70'E-W but has no obvious signs of flow. There are a few patches with organic (rainbow) sheen on the surface



Continuing west, **GW-2** is still present at the location previously staked as a POE. There is a small (>1' wide) flow channel going SW from the POE for about 90 feet. There is a very limited flow in the channel 0.25 to 0.50 gpm. It is quite difficult to detect flow. There are a few patches with organic (rainbow) sheen on the surface.

West of GW-2 there is a small stream of emergent groundwater originating in a seep. This seems to be continuous from a wet area at the base of the slope near **PZ3a**. The flow is well organized in a well defined channel and probably moves at 1-2 gpm flowing toward SE to meet flow from area of GW-2. Together these two flow sources continue toward the river.

West of GW-2 there is a large area in green briars which has become covered with saturated soils of low shear strength and is laced with small points of emergent groundwater too numerous to identify individually. This is the only new area noted on the Map at the end of this Report.

The western slope of the RIBs along the unnamed stream coming from Adams Street is saturated. We had previously identified **GW-3a**, **GW-3**, **GW-7**, **GW-8**, and **GW-9** in the field as distinct points of emerging groundwater. As has been previously noted, all of the emergent groundwater points along this slope have essentially merged into a single long area of emerging groundwater and over saturated soils with little shear strength resistance.

The unnamed stream which passes under Adams Street appear to increase in flow by 10-15% as it runs along the west end of the RIBs.

Pre previous inspections, we made the return traverse along an elevation of about 170 -180 feet and no new areas of emerging groundwater were noted.

The long grassed slope at the southwest corner of the beds near PZ-2a has not received as much lawn mowing as in previous times. We spoke to the WWTF plant manager and we discussed the need to keep that slope open for observation and free of any woody shrub growth which and create root ball uplift in the event of high winds. He indicated that he will equip the WWTF lawn mower with better tires to tackle the steep slope and be able to visit that area more often in the future.

All locations noted in the report above were flagged and dated with pink flagging.

2008 Annual Inspection Summary & Conclusions

The annual slope inspection performed in October 2008 found only one notable change from the previous inspections. Emergent groundwater was understandably less evident and in smaller flow amounts than were noted in April of 2007. This is not unexpected given the usual dryer conditions in the fall of the year. There were no new locations with emergent groundwater only one area of expanded groundwater presence, which were marked in the field west of GW-2 for review in future inspections.

The artificial slopes, which were graded and grassed as part of the RIBs construction, remain stable and vegetative cover increases.



We look forward to your review and comment on this 2008 Slope Stability and Erosion Report. It is our intent to maintain the fall cycle by performing the 2009 Inspection in October or November 2009. If you have any questions regarding this document please do not hesitate to contact me at 781-251-0200.

Very truly yours,

WOODARD & CURRAN, INC.

A handwritten signature in cursive script that reads "Joseph D. Shea".

Joseph D. Shea, P.E.
Vice President

JDS/ls
Project 207707.11

Attachment: Figures C-1 for 2008

cc: Doug Halley, Director of Health, Acton
Tom Tidman, Natural Resource Agent, Acton
J. Cary Parsons, Hydrogeologist, Woodard & Curran
Bill Luksha, Vice President, Woodard & Curran
John Parkhurst, Plant Manager, Woodard & Curran

