

Boston Groundwater Trust

1999 Annual Operating Report Boston Groundwater Trust

The Board of Trustees of the Boston Groundwater Trust is pleased to present the following report of the Trust's operations during the past year and also to outline our program for the year 2000. We are grateful to the City of Boston for agreeing to fund our ongoing groundwater-monitoring program. And we acknowledge the cooperation of Wentworth Institute of Technology interns, Chris Simonelli and Matt White, who have been "in the field" taking readings, and the invaluable assistance of James R. Lambrechts in initiating that project in 1999. Thanks to these efforts, in place now is the first regular monitoring program since deteriorated groundwater levels and serious foundation damage were identified in the 1930's. This is a momentous achievement that has important consequence for the City of Boston.

Additional thanks are due to sponsoring civic organizations that have made their nominees available for Board of Trustee service following appointments in 1997 by Mayor Menino.

Our hope now is to significantly increase the number of well sites being monitored. Toward that goal, important financial support from The Raymond Property Company and Boston Properties has made possible contemplation of a first phase expansion plan, which is currently scheduled for later this year. Trustees are now pursuing capital improvement funding to further enlarge the well network from the current 100 locations up to 1000 wells in the next two years.

6/5/00

ACCOMPLISHMENTS IN 1999 BOSTON GROUNDWATER TRUST

A summary of accomplishments of the Boston Groundwater Trust in 1999 are listed below:

1. **Groundwater Level Data Base Development:** Computer software was adapted to storage and retrieval of groundwater level data. Excel spreadsheets have been set up to store and retrieve this data.
2. **Base Plans:** CAD Files were obtained from BWSC that provide base maps showing streets, buildings, and utilities in the study area, and on which the observation well locations have been superimposed. An interface between database and CAD plan is being developed. Plans are related to the Massachusetts Plane Coordinate system. Locations of observations wells entered in CAD plan system based on measurements made in Task No. 6.
3. **Solicitation of Groundwater Level Data from Private Parties and Public Agencies:** With H&A knowledge of activities by various developers, building owners, and city agencies, letters were prepared and sent requesting access to data on groundwater elevations, and on observation well locations for specific projects in the study area. Some data have been received. More follow-ups are needed.
4. **Locating Observation Wells and Determining Working Condition:** Field work was done in 1999 to locate each observation well shown to be functional in the 1990 inventory report by Stone & Webster. Subsequently other observation wells were added as found in public sidewalks (many of which had been installed by those parties contacted in Task No. 3.)

5. **Measuring Groundwater Elevations in Functional Observation Wells and Recording Data:** Measured groundwater elevations in each well. (Four to six readings made for the year, at about two per semester). Data was entered in the spread- sheet database, and summary tables were produced for each monthly meeting of the Trust.
6. **Surveying to Determine Observation Well Reference Elevations and Field Locations:** A team of two Wentworth Institute of Technology co-op students performed level surveying to determine the ground elevation of each well, using references to established elevation benchmarks that are throughout the Back Bay (determined from data on elevations of reference benchmarks currently in use by H&A). Plan measurements were also made by the pair from existing features shown on the base maps to locate each observation well, for inserting on locations in the CAP mapping files. Wells are predominantly located in areas where buildings are on steel or concrete piles.

Very few of the wells are in areas of wood pile foundations.

7. **Purging Water from Observation Wells to Verify Functionality:** Each well was tested for groundwater level recovery rate by withdrawing approximately 2 to 4 gallons of water, determining achievable water level lowering, and monitoring groundwater level recovery. Wells in which the water level could not be lowered significantly were deemed to be functioning adequately. Wells which recovered to near or slightly above their initial levels within a few hours were also judged to be adequate. Only 9 out of the 152 wells that were purged were considered to have poor/unacceptable response (and have been marked for needing revitalization, or deletion from the program).
8. **Report of Period Activities:** The two co-op students prepared brief summary reports that included tables of data and plans indicating the groundwater elevations of each well.

YEAR 2000 PROGRAMS BOSTON GROUNDWATER TRUST

Activities planned by the Boston Groundwater Trust for the year 2000 are as follows:

1. **Measurement of Groundwater Elevations:** Continue to measure all operable observation wells at least three times per semester (approximately 10 readings per year). Continue to update database with new data from these readings, within one week of the readings. Develop study area plans to summarize "problem" areas with groundwater levels below Elev. +6 BCB as each set of new elevations are gathered.
2. **Prepare for and Monitor the Installation of New Observation Wells:** Prepare plans and forms for P.I.C. authorization for each proposed new observation well location. Solicit cost proposals from 3 different drilling companies for making the Phase I observation well installations. During the installation of new observation wells in the Fenway/Symphony and Back Bay areas (where about 125 new wells are needed). Monitor the drilling contractor's installation of each new well and document details of each installation in the database.
3. **Building Permits Search at Inspectional Services:** Research files/permit jackets at ISD to determine extent of areas of wood pile foundations at the perimeter of the principal study area. Areas identified will also be included in further study of groundwater levels.
4. **Base Plans:** Continue work on the plans, ensuring that all wells are properly located. Obtain updated databases from BWSC (or BRA) as available to correct certain building locations.

5. **Collection of Groundwater Level Data from Public and Private Parties:** Update database with new well data being obtained from various developers, building owners and city agencies that agree to being in the program. Expand the database to allow including groundwater level data from previous years.
6. **Locating Additional Existing Observation Wells:** Continue to search for other existing observation wells, which were not identified in the 1990 report by Stone & Webster, or were recently installed. Determine ground surface elevations by level surveying for new wells. Use any additional information provided by other parties (from No. 5 above), to locate additional wells.
7. **Launch of Web Site:** Reformat and maintain mapping and well monitoring data for public accessible display, on-line.

**YEAR 2000 OPERATING BUDGET
BOSTON GROUNDWATER TRUST**

I. Wentworth Co-op Researchers:	\$43,640
First Student @ 3 semester per year @ 17 weeks per period. One Student @ 40 hrs/wk @ \$16/hr =\$640 dollars/wk x 51 wks =\$32,640 dollars/yr for one student Second Student for summer period of 17 weeks of field work (1/3) = \$11,000 (Supervision of new observation well installation).	
II. Reimbursable Expenses:	\$ 3,900
-Field Equipment & Related	\$ 3,500
-Office Supplies, Reproduction, Postage	\$ 400
III Web Site:	\$10,000
-Development, Updating, Maintenance and "Rental"	_____
Sub-total	\$57,540
10% Contingency	\$ 5,754
TOTAL CALENDAR 2000 OPERATING BUDGET	\$63,494

**CAPITAL NEEDS BUDGET - YEARS 2000, 2001, 2002
BOSTON GROUNDWATER TRUST**

In order to establish observation of groundwater levels at the frequency and distribution of locations as recommended by engineering analysis for the 2000 acre area of the City of Boston deemed vulnerable to possible foundation deterioration, the Trust envisions a critical need to expand the monitored network. The Trust estimates that the following three phased incremental budget will result in an increase in the number of wells observed to a required network of 1,000 locations. Trustees are now seeking commitment of funds to make these capital improvements possible.

The following cost estimate for installation of one (1) observation well in year 2000 is based on a minimum quantity of 20 wells per contract and included here for reference in analyzing the projected annual budgets below:

Items:	Budget:
Material	\$250
P.T.C. Permit	\$250 *

P.I.C. Permit	\$350	^
Street Permit	\$250	
Rig/Crew Labor	\$800	avg.
Police Detail	\$160	
Utility Clearance	\$100	
Total	\$1,910	

*A request would be made to have this fee lowered by the P.I.C.

YEAR 2000 CAPITAL BUDGET

Phase I - Expansion of Observation Well Network at Existing Critical Locations
\$50,000.

Install approximately 25 new monitoring wells at critical locations in Back Bay and Fenway/Symphony areas @ \$2000 each.

YEAR 2001 CAPITAL BUDGET

Phase II - Expansion of Observation Well Network
\$1,000,000.

Install approximately 500 new observation wells @ \$2000 each. This will achieve an averaged density of one well per 2 acres, as baseline coverage similar to that of the WPA Program in the 1930's.

YEARS 2002 / 2003 CAPITAL BUDGET

Phase III - Expansion of Observation Well Network in Areas of Lower than Normal Groundwater Levels
\$1,200,000.

Install an estimated number of 500 new observation wells, @ \$2400 each. Following observations of the then expanded monitoring well network, specific areas of lower than normal groundwater will be investigated. Those areas identified as having levels below minimum "safe" elevations will require these additional wells to be installed to further define the location of lowered groundwater.

Engineering analysis estimates that 15 such Low Groundwater Locations will be identified in the first two years after Phase II wells have been installed. Using an average of 30 wells as being needed to "localize" the point of the lowering and better define an approximately three blocks local area of severe impact results in the projected need of 500 additional observation wells.

An estimate of the average cost of \$2,400 per well is used due to the limited number of wells to be installed at any one time, and the cost to mobilize/demobilize for each series of field installations.

Return to: Organization