

- The Wastewater Planning Task Force, of which Concord Public Works is a part, awarded a contract to develop a Wastewater Capacity Alternatives Analysis.
- The manufacturer replaced both CCRSD fields with an improved version of artificial turf, addressing an issue with lead content. This work was performed at no cost to the Town under a warranty replacement.

#### *CPW Leadership and Innovation*

- Concord Public Works received MassDEP's Public Water Supplier – 2010 Water Conservation Award for exhibiting “exemplary water conservation practices”.
- Anna Trout was appointed as “Team Leader” for the Communications and Collaborations Team, established by the Town Manager and Senior Management Team to explore opportunities for improvement in this area.
- Concord Public Works staff coordinated with the Council on Aging to provide lunch for over 80 attendees at the Harvey Wheeler Center.

#### *Learning and Growth*

With the ever increasing complexity of public works operations, the need for professional development of CPW employees continues to play an important role in the organization. Concord Public Works is committed to providing its employees with opportunities to increase skills while endeavoring to make certain our team is comprised of motivated, informed and inspired team members who can utilize this knowledge for the benefit of Concord.

#### *Public Works Week – Middle School Event*

Concord Public Works celebrated the 50th Anniversary of National Public Works Week at the fourth annual event that the entire 8th grade from Concord Middle School has participated in. The theme was “Above, Below and All Around You”.

A special celebration and tribute was made to William Wheeler at the Wastewater Treatment Plant, after which tours of the facility were provided to the audience and students.

CPW staff utilized its hydraulic lift bucket truck to photograph the students and others forming a “375” for Concord's 375th Birthday Celebration.

Doug Shattuck who teaches the Applied Technology course to all these students, worked closely with Anna Trout and Concord Public Works staff to coordinate this educational experience which included visits to Warner's Pond Dam, the High School Playing Fields

and Concord Public Works at 133 Keyes Road, where the students were provided with interactive demonstrations by CPW staff.

#### *Personnel*

Concord Public Works appreciates the contributions made by the following employees who moved on from their positions within the department. These include Michael McLaughlin (Engineering Division) and John Katin (Highway Division).

We were happy to welcome Reginald Fennell as a Water/Sewer Treatment Systems operator and Hardik Ravel as Public Works Engineer-Water.

## **ENGINEERING DIVISION**

William J. Renault PE,  
Town Engineer

The Engineering Division is responsible for the planning, design, engineering and construction of Town roads, sidewalks, drainage, bridges and stormwater infrastructure assets. The Division provides a wide range of professional engineering and construction management services for Concord Public Works (Administration, Solid Waste, Water, Sewer and Highway/Grounds/Cemetery) and other Town departments and boards.

The Division manages the Town's Geographic Information System (GIS) services and maintains Town-wide inventories, database, mapping and document control for Concord's public right-of-ways, easements, infrastructure and natural resources.

#### *Roads and Sidewalks Program*

There are approximately one hundred and seven miles of public roads, classified as arterial roads, collector roads and local streets. Arterial roads provide movement between collector roads, other arterial roads and major highways and make-up approximately 34% of Concord's public roads. Collector roads, used primarily to connect local streets to other collector and arterial roads, make-up approximately 7% of Concord's public roads, and the remaining 59% of public roads consist of local streets. In addition, Concord has 55 miles of public sidewalks.

Concord's pavement management strategy and 20-year Roads and Sidewalks Program emphasizes ad-



*Drainage project on Whittemore Street*

equate investment in road and sidewalk/handicap ramp rehabilitation combined with preventive and routine maintenance. This program is based on a condition survey of the roads and sidewalks performed every four years. This program utilizes pavement management software, in-house engineering/ operations knowledge and Town-wide utility planning to select pavement treatment and maintenance options.

A key element used to enhance road pavement maintenance is the extensive use of crack sealing. The use of this material enables CPW to maintain the integrity of existing road structures while improving selected roads by means of reclamation and cold plane/overlay pavement treatments.

### *2.43 Miles of Roads Improved*

The roadway improvements completed as part of the Roads Program included reclamation of Sarah Way, Mildred Circle, Nimrod Rd., MacArthur Rd., Ministerial Dr. and Tarbell Spring Rd., as well as the mill and overlay of Sudbury Rd. (from Main St. to Thoreau St.), Old Stow Rd. and Hillside Ave.

### *10.15 Miles of Roads Maintained*

Roads receiving maintenance through the Crack Seal program included: Old Bedford Rd., Bedford St., Lexington Rd., Commonwealth Ave., Main St. (Church St. to Water St. and Route 2 to Elm St.), Pine St., Harrington Ave., Old Marlboro Rd. (ORNAC to Williams Rd.), Virginia Rd., Williams Rd. and Commerford Rd.

### *3.4 Miles of Sidewalks Improved*

The sidewalk program included 1.6 miles of sidewalk re-

habilitation on Bayberry Rd., Deacon Haynes Rd., Hill St., Lapham Rd., Ministerial Dr., (2 sections), Upland Rd., Sudbury Rd., West St., Loring Rd., and Anson Rd. The project also included 1.8 miles of sidewalk extension on Lowell Rd. and Powder Mill Rd.

### *Roads and Sidewalks in Sound Condition*

The accompanying tables show that the condition of Town roads remain within the target range of 80-85 PCI (Pavement Condition Index). However the Town's sidewalks have fallen below the target SCI (Sidewalk Condition Index). Preliminary calculations show that maintaining the current maintenance investment will allow the Sidewalk Program to meet its recommended range by the end of the 2011 construction season. The Town's overall investment in its road and sidewalk assets have resulted in cost effectively protecting and improving Concord's public way infrastructure for pedestrians and drivers while avoiding a multi-million dollar backlog to be paid by future residents of Concord.

#### ROAD CONDITION SUMMARY

Pavement Condition Index (PCI) Network Average	2010*	2009	2008	2007
Recommended Repair(s)				
Rehabilitation	8%	9%	12%	14%
Routine Maintenance	48%	51%	52%	42%
No Maintenance Required	44%	40%	36%	44%

\*Includes 2010 Roads Program work to be completed by June 30, 2011

*Note:* The above referenced table is based on an infinite budget.

- Using the \$1M FY2011 budget, the *recommended* repairs breakdown is: (Rehabilitation 2%, Maintenance 4%, No Work Performed 94%)
- Using the \$1M FY2011 budget, the *performed* repairs breakdown is: (Rehabilitation 2%, Maintenance 10%, No Work Performed 88%)

#### SIDEWALK CONDITION SUMMARY

Sidewalk Condition Index (SCI)	SCI		
	Range	Miles	Percent
Replace	0-50	8.0	14%
Localized Repair	51-70	5.5	10%
Shows wear –routine maintenance	71-90	28.8	52%
Shows No Distresses	91-100	13.6	24%
<b>TOTAL MILES</b>		<b>55.9</b>	<b>100%</b>

#### Network Average (%)

Year	SCI
1999	80%
2007	77%
2008	76%
2009	76%
2010	75%

### *Other Roads & Sidewalks Projects*

The CPW Engineering Division continued to progress toward project closeout for the Route 62 Footprints

Roadway Reconstruction Project. The Engineering Division developed the project's final punch list and completed the final site walk with MassDOT representatives. MassDOT's project contractor still needs to complete final punch list items prior to release of retainage.

CPW also completed the reconstruction of the Sudbury Rd. and Thoreau St. intersection. The project included the replacement of signalization equipment within the intersection, the addition of turning lanes through curb widening and the installation of vehicle detection to improve the overall operation of the intersection. Remaining work includes the installation of the vehicle detection system, pavement milling and overlay and installation of new thermo-plastic pavement markings.

#### *Stormwater/Drainage*

Concord is a "rivers community" with a stormwater/drainage infrastructure consisting of 200+ culverts, 315+ drainage outfalls, 3,700+ catch basins, 1700+ manholes, and 50+ miles of drain lines. The Town is also responsible for three dams. CPW plans, coordinates and performs drainage improvements in conjunction with the Roads and Sidewalks Program to minimize disruptions and to eliminate expensive emergency repairs. Drainage maintenance activities are coordinated with the Division of Natural Resources and are performed under the general maintenance permit issued by the Natural Resources Commission.

CPW Engineering staff developed a Drainage System Inventory and integrated the data into the Town's Geographical Information System (GIS). This work provided the basis for developing a 20-year Stormwater/Drainage Management Plan. The Plan's goal is to improve, protect and maintain Concord's public storm water/drainage infrastructure through scheduled maintenance and planned replacements and enhancements. The CPW Stormwater Team continues

to inventory and assess the locations and condition of Concord's Stormwater/Drainage infrastructure. When completed, a stormwater/drainage condition index will be calculated for each structure, each category and for the overall system.

The Engineering Division began a Town-wide culvert inventory and condition assessment to further the development of the drainage GIS layer. The project will collect elevation, invert and condition data to be used in developing a hydraulic model. The project will also develop a rating system to prioritize future use of capital drainage funds.



*Flooding at Route 117, March 2010*

Town Meeting appropriated the sum of \$205,000 to continue the multi-year effort to improve the condition of the Town's stormwater system. A major purpose of the Stormwater/Drainage Management Plan is to prevent expensive emergencies from occurring in the future through a planned and scheduled maintenance and replacement program.

Multiple improvements to the Town's drainage system were constructed in coordination with the Roads Program. This work included the catch basin replacements on Ministerial Dr., Tarbell Spring Rd., Sudbury Rd., Hillside Ave., and Nimrod Dr. The Division also designed and bid a drainage extension on Whittemore St. to address the puddling/flooding areas within the street and was completed in coordination with Water/Sewer Division and CMLP that installed water main and new electrical conduit respectively. Lastly, the Engineering Division designed and permitted the culvert replacement on Farmer's Cliff Rd.

The Division designed and permitted the replacement of the Spencer Brook Culvert at Westford Rd. that had been damaged during March flooding. The Division prepared an application to FEMA in an attempt to receive \$69,000 in Hazard Mitigation Grant Program (HMGP) funding to supplement the required repairs

on the culvert. The proposed design will increase the hydraulic opening.

#### *NPDES Permit*

Work related to the Town's compliance with the National Pollution Discharge Elimination System (NPDES) Phase II General Permit is funded and coordinated through the Drainage Program. The permit requires towns to meet multiple objectives called "minimum control measures" to improve water quality with the Commonwealth including public outreach, drainage system mapping, illicit discharge/detection and elimination (IDDE), construction sediment control and site plan project review. In 2003, the EPA issued a draft permit for minimum control measures for the Merrimack Watershed which covers Concord. It is anticipated that the Merrimack Permit will be finalized and issued within 2011.

The Engineering Division coordinated the sampling and testing of 80+ prioritized outfalls related to the IDDE plan developed for the 2003 NPDES Permit. The Engineering Division continued coordination and inspection reporting with the Highway Division for the catch basin cleaning program. The program utilizes a mobile inspection form that is integrated with the Town's GIS system. The inspection results are then utilized by the Highway and Engineering Divisions in prioritizing future repairs.

The Division designed a new porous pavement parking lot for the Tuttle Trail located off of Walden St. The parking facility, which utilizes Low Impact Development techniques, will be a three season parking area for handicapped users of the trail. The parking facility was constructed by Highway Division.

#### *Bridges*

Engineering staff continued to monitor the wearing conditions and structural integrity of the five Town-owned bridges -- Flint Bridge, Heath's Bridge, Nashawtuc Bridge, Pail Factory Bridge and the Pine Street Bridge. Staff coordinated inspections/repairs/construction planning with the Massachusetts Department of Transportation (MassDOT).

- Nashawtuc Bridge –Engineering Division completed the design, permitting and installation of abutment repairs. The work included the installation of a stone armament on three of the abutment corners to eliminate the erosion

of the matting, loam and seed abutment protection.

#### *Geographic Information System (GIS)*

Throughout the summer and fall, the GIS Program focused on working to improve drainage system data layers. The work focused on correcting drainage pipe locations, populating elevation and pipe material/size information from existing town record plans and beginning data collection utilizing the newly purchased sub-centimeter GPS unit. The GIS program is also administering the new culvert condition inspection and inventory project outlined above which will build on the drainage data by creating a new culvert GIS layer.

In an effort to look ahead, the GIS program began preparations for an RFP to seek consulting services to develop a new GIS strategic plan for the Town of Concord. A similar project was completed approximately 5 years ago. CPW contacted several firms and conducted interviews to identify cutting edge GIS uses for all Town departments, discuss possible improvements to GIS infrastructure/architecture and to identify a new list of capital projects.

#### *Technical Support*

Engineering staff provides engineering and construction management support services for CPW and various Town departments, boards and commissions.

The Town Engineer continued to participate on the Route 2 Corridor Advisory Committee (CAC) to address several projects:

- Crosby's Corner – The Engineering Division continued the project's stormwater review in conjunction with MassDOT's Notice of Intent filing to the Concord



*Residents enjoying the ice rink made by Concord Public Works at Emerson Field.*

Natural Resources Commission. The project received its denial from the NRC and denial of the superseding order of condition and remains on track to receive its Wetland Protection Act variance to meet the construction bid advertisement date of September 2011. The Town Manager, Concord Public Works, Public Works Commission and Board of Selectman have worked closely with officials at MassDOT in the development of an agreement to provide the Town with up to \$7.5 Million dollars in funding for major roadway and drainage rehabilitation on Cambridge Turnpike. This work will include the construction of storm water improvements downstream of the Crosby Corner Project to address the additional stormwater volume that will be generated by the project.

- Route 2/Concord Rotary – Mass Highway’s design consultant is in the process of preparing the filing of the Environmental Impact Report with MEPA along with preparing the 25% design plan set. The design consultant has been performing subsurface boring tests in critical locations of the project including proposed bridge locations, proposed drainage basin locations and proposed retaining wall locations. No construction timeline is planned at this time as the project is not within the current Transportation Improvement (TIP) Program, but remains on the MPO’s “illustrative project list”.

## HIGHWAY & GROUNDS DIVISION

Dickinson Fowler,  
Highway & Grounds Superintendent

The Concord Public Works Highway and Grounds Division maintains approximately 107 miles of public streets along with the associated drainage systems consisting of almost 50 miles of drain lines, over 3,700 catch basins, 200+ culverts, 1,700 drainage manholes and 315 outfalls. In addition, the Highway and Grounds Division maintains 55 miles of sidewalks, 2,793 signs, over 90 CPW vehicles and equipment, and manages the compost facility. It is responsible for 82 acres of public parks and grounds including 39 acres of active recreation areas (10 athletic fields). The Division maintains all public shade and park trees, under the direction of the Park and Tree Supervisor who is also the Town’s Tree Warden.



### *Snow Removal Program*

*2010 saw continuing activity for the Department’s winter maintenance personnel, including the ongoing use of salt and sand as well as brine to keep the roads and side walks safe and passable. There were five storm events requiring full mobilization of forces involving Town staff and plowing contractors while the entire winter maintenance season included twenty-five events requiring a response for snow and ice maintenance. One event just before the Christmas holiday required a full snow removal in the Town centers with all other removals throughout the season handled by Highway and Grounds forces only.*

### *Roads and Sidewalk Maintenance*

The Highway Division manages the contracts for several major maintenance programs including Catch Basin Cleaning as well as pavement preservation strategies such as infra-red patching. These programs were completed in the spring and fall during cooler temperatures. Highway crews reclaimed several sections of roadway with full-depth patches of distressed pavement in preparation for certain road projects as well as those roads scheduled for crack sealing. Roads and areas which received this treatment included the Compost Site, Rte. 117, Sudbury Rd., and Barretts Mill Rd. Berms were installed on Strawberry Hill Rd., Chase St. and Williams Rd. to better control water flow and minimize erosion.

In addition to the typical duties of road repair and maintenance, sign repair/ replacement, roadside brush cutting and street sweeping, the Highway and Grounds Division carried out sidewalk maintenance work that included both overlays and reconstruction on ORNAC, Minot Rd., Butternut Cir., Fox Lane, Elm St., Main St., Thoreau St., and Walden St. A number of other smaller repair projects were completed in cooperation with Concord Light, Water and Sewer Division, and