

- Snow removal operations were performed including 34 events which required a response for snow and ice maintenance.
- DropOff SwapOff events held in May and October included unwanted medication and Sharps collection.
- Project construction oversight of the utility scale solar project at the closed municipal landfill located on Walden Street.
- A seasonal water use advisory was issued on May 1, extending through September 30
- Re-establishment of a rebate program for high efficiency clothes washers and low flow toilets.
- Environmental Partners Group (EPG) completed a pilot study of preferred treatment technologies for Nagog Pond. Based on the successful outcome of those activities, EPG is proceeding with preliminary design of the full scale treatment facility.
- Numerous water main extension and replacement projects including the Southfield and Riverdale Rd., neighborhoods, Squaw Sachem Trail, Monsen Rd., Cottage Lane and Old Mill Rd.

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.

Safety

CPW's Safety Team continued its focus on a comprehensive Safety Manual. Ongoing meetings and initiatives continue with the goal of maintaining safe work practices for the benefit of employees and Town residents.

Public Works Week – Middle School Event

Concord Public Works celebrated National Public Works Week on May 21 with the 8th grade class from Concord's Middle School for the seventh consecutive year. The theme was "Building for Today – Planning for Tomorrow". The entire public works team worked with CPW's Administrative and Special Projects Coordinator, Anna Trout and Applied Technology Teacher, Doug Shattuck to showcase the importance of public works. Events included stormwater system maintenance, stormwater and

water quality, hazardous waste disposal, a tour of the Wastewater Treatment Plant, best management practice for turf grass and presentations of stormwater pollution prevention videos created by the students.



pH testing at Rideout Playground by 8th Grade Students during Public Works Week Celebration.

Personnel

We were happy to welcome the following employees to our staff: Tony Donlon, Highway Equipment Operator, Peter Laptewicz, Engineering GIS Technician/Analyst, and Andrew Walker, Highway Equipment Operator.

ENGINEERING DIVISION

William, J. Renault, P.E.
Town Engineer

The Concord Public Works (CPW) Engineering Division is responsible for the planning, design, engineering and construction of the Town road, sidewalk, bridge, and stormwater/drainage infrastructure assets. CPW's Engineering Division provides a wide range of professional engineering and construction management services for Concord Public Works and other Town departments and boards.

Roads 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.

Concord's pavement management strategy and 20-year Roads Program emphasize adequate capital investment in the roadway network combined with preventive and routine maintenance activities to prolong the pavement life cycle. Capital roadway improvements typically include the reclamation, mill and overlay and overlay pavement treatments. The reclamation treatment pulverizes the roadway's pavement, regrades the new subgrade material and installs two new layers of hot mix asphalt pavement. A mill and overlay treatment cold planes off the top wearing course of pavement and a new pavement layer is installed over the grooved pavement. An overlay treatment is a thin asphalt layer installed over an existing roadway.

A condition survey of the Town's roadway network is performed every four years and entered into the Town's roads program software. This survey was most recently completed within the 2014 calendar year. The software utilizes the pavement condition data, estimated traffic volumes and treatment cost to recommend pavement improvement projects. CPW's Engineering Division then utilizes this software output, engineering judgment and planned utility improvements to finalize the year's roads program.

Maintenance activities are used to preserve the integrity of the existing road structures while reducing the need for the more costly rehabilitation treatments. Crack sealing is utilized as the primary preventative maintenance activity, while full depth patching/spot repair is the primary routine maintenance activity used by CPW.

3.07 Miles of Roads Improved

The Engineering Division completed the internal design and bid for the 2014/15 Roads Program which improved 2.54 miles of Concord's roadways. The bid included 0.36 miles of reclaim treatment on Seven Star Lane and Belknap St. (RR to Thoreau St. & Thoreau St. to Main St.), 2.03 miles of mill and overlay treatments on Old Bedford Rd. (1200 ft. starting at Lexington Rd.), Spencer Brook Rd. (Town Line to Westford Rd.), Monument St. (Monument Square to Bridge), Barnes Hill Rd. (Lowell Rd. to Estabrook Rd.), Estabrook Rd. (Cedar Way to Barnes Hill Rd.), Church St. (100 feet starting at Main St.) and lastly an overlay treatment for an 800-foot section of Bedford St. The bid also included significant drainage improvements on Powder Mill Rd., Belknap St. and Seven Star Lane. The 2014/15 Road Program work began in the fall of 2014 on Powder Mill Rd. and Seven Star Lane. The

balance of the contracted work is scheduled to be completed by the summer of 2015.

The Town received additional State aid transportation funding through the Winter Rapid Road Recovery Program (WRRRP). Funds from this one-time payment were targeted towards the rehabilitation of Commonwealth Ave., from the Pail Factory Bridge to the Rotary. The project was designed internally and added as a change order to the 2013/14 Roads Program contract. The Commonwealth Ave. rehabilitation included 0.53 miles of mill and overlay treatment as well as minor drainage rehabilitation work.

22.2 Miles of Roads Maintained

The crack seal program maintained 6.8 miles of roadway. Roads selected were treated with a hot-poured asphalt fiber compound, specifically designed to improve the strength and performance of asphalt pavements and extend the life expectancy of the road. The roads receiving treatment included: Musketaquid Rd., Simon Willard Rd., Musterfield Rd., Attawan Rd., Laurel St., Everett St., Grove St., Domino Dr., Damon St., Ministerial Dr., Lapham Rd., Loring Rd., Wright Rd., Heywood St., Heath's Bridge Rd., The Valley Rd., Holdenwood Rd., Holden Lane, West Circle, East Circle, Martha's Point and Oxbow Dr.

In addition to the crack sealing efforts, CPW's Highway Division also completed significant roadway maintenance. The Highway Division performed full depth patching and pot hole repair for 15.4 miles of the Town's roadway network. This total was significantly higher than typical years, as the 2014 winter was especially severe with several freeze and thaw events. Repairs were completed on: Annernac Hill Rd., Assabet Ave., Ball's Hill Rd., Barrett's Mill Rd., Bartlett Hill Rd., Blueberry Lane, Bow St., Brister's Hill Rd., Carr Rd., Channing Rd., Church St., Elm St., Garrison Rd., Grove St., Lang St., Lapham Rd., Loring Rd., Lowell Rd., Main St., Ministerial Rd., Minot Rd., Minuteman Rd., Monsen Rd., Monument St., Musketaquid Rd., Old Marlboro Rd., Old Mill Rd., Partridge Lane, Prescott Rd., Red Coat Lane, Ripley Hill Rd., Silver Hill Rd., Sudbury Rd., Temple Rd., Turning Mill Rd., Walden St., Westford Rd. and Wood St.

Cambridge Turnpike Improvement Project

The Cambridge Turnpike Improvement Project will construct roadway improvements to address a major flooding issue that causes frequent closure of the roadway in

heavier rain events. The Town views this as an important opportunity to design and construct improvements to the roadway and other public infrastructure to enhance the experience of the people who use the area. To the extent that is feasible, a project objective will be to integrate several modes of transportation in an aesthetically pleasing manner that complements the community's character and is sensitive to the nearby environmental and historical resources that Concord residents value and enjoy. CPW initiated a significant public outreach program for the project to provide residents multiple input opportunities as the project's design is advanced.

CPW's Engineering Division provided consultant management and technical engineering guidance for the preliminary design and permitting efforts for the project. Work included the technical review of the 50% design submittal as well as management of the Letter of Map Revision (LOMR) submittal with FEMA. CPW's Engineering Division received consensus from FEMA on a revised 100-year flood elevation for the upper Mill Brook watershed. The LOMR will lower the flood plain elevation in the upper Mill Brook watershed 3.5' - 4.5' from Main Street to the Crosby Dam. Public Notice was provided in the *Concord Journal*, which started a statutory 120 day appeal period.

Sidewalk Program

Concord's sidewalk management strategy emphasizes adequate capital investment in repair to the existing sidewalk network to maintain and/or improve the pedestrian experience for all sidewalk users. Upgrades to meet American with Disabilities Act (ADA) standards are funded through the sidewalk program. The sidewalk network contains approximately 59 miles of public sidewalks and approximately 875 curb ramps. A condition survey of the sidewalks is performed every four years in conjunction with the roadway condition survey. Additionally a Town-wide curb ramp inventory and condition assessment was completed in 2011. The inventories and conditions are updated annually based on repairs, reconstructions or installation of new ramps.

Sidewalks and curb ramp projects are prioritized for repair based on their proximity to high pedestrian generators, overall condition and compliance with current ADA accessibility standards. Sidewalk and curb ramp reconstructions are bid as standalone projects, included within the roads program bid or completed as internal projects by CPW Highway Division.

0.20 Miles of Sidewalk and 75 Curb Ramps Improved

CPW Engineering Division did not complete a separate sidewalk program bid in 2014. Minor sidewalk rehabilita-

ROAD CONDITION SUMMARY

Pavement Condition Index	2006	2007	2008	2009	2010	2011	2012	2013	2014*
(PCI) Network Average	83	84	83	81	82	80	80	81	81
(PCI) Arterial/Collector Average				88	86	84	82	87	85
(PCI) Local Road Average				75	79	78	77	77	79

* Includes 2014 Roads Program work to be completed by November 2015.

Recommended Repairs	2006	2007	2008	2009	2010	2011	2012	2013	2014
Rehabilitation	13%	14%	12%	9%	8%	8%	10%	6%	7%
Maintenance	46%	42%	52%	51%	48%	52%	51%	40%	29%
No Maintenance Required	41%	44%	36%	40%	44%	40%	39%	54%	64%

Note: The above referenced table is based on an infinite budget. Using the FY2014 budget, the actual performed repairs breakdown was: (Rehabilitation 1%, Maintenance 9%, No Work Performed 90%)

SIDEWALK CONDITION SUMMARY

	Sidewalk Condition Index (SCI)			Year	Network Average		
	SCI Range	Miles	Percent		SCI	Year	SCI
Replace	0-50	1	1%	2005	82	2010	75
Localized Repair	51-70	15	26%	2006	82	2011	81
Shows Wear	71-90	34	59%	2007	77	2012	81
No Distresses	91-100	8	14%	2008	76	2013	78
Total Miles		58	100%	2009	76	2014	82*

*re-inventoried

tions and ADA curb ramp improvements were incorporated within the Roads Program bid. 75 curb ramps were reconstructed within the roads program to bring them current with the ADA standards related to width, slope, and surface type.

Roads and Sidewalks in Sound Condition

The accompanying tables show the condition of Town roads and sidewalks. The roads are within the target range of 80-85 PCI (Pavement Condition Index). The Town's sidewalk network has returned to the target range of 80-85 SCI (Sidewalk Condition Index). The Town's overall investment in its road and sidewalk assets has 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.

Stormwater/Drainage Program

Concord's stormwater infrastructure consists of approximately 179 culverts, 431 outfalls, 950 drainage manholes, 2,292 catch basins, 205 leaching structures, 59.6 miles of drain lines, 16 detention basins, 4 bioretention areas and 3 dams. Concord Public Works plans, designs, coordinates and performs construction of drainage improvements in conjunction with the Roads and Sidewalks Programs to minimize disruptions and to eliminate expensive emergency repairs. All drainage maintenance activities are coordinated with the Division of Natural Resources and are typically performed under a general maintenance permit previously issued by the Natural Resources Commission.

In 2002 and 2003 the Town performed a closed drainage system inventory and in 2011 completed a culvert inventory. Within these inventory projects, condition assessments and rating systems were developed and integrated into the Town geographical information system (GIS) to provide the basis for the development of the Town 20-year Stormwater/Drainage Management Plan. This Plan is intended to provide a cost-effective framework for the upgrade and repair of the Town's stormwater/drainage system and to prevent expensive emergency repairs from occurring in the future through a planned and scheduled maintenance and replacement program.

Staff continues to update the location and condition data of Concord's Stormwater/Drainage infrastructure within the GIS system. CPW Highway Division staff verifies and supplements GIS drainage data during annual catch basin system cleaning operations. CPW Engineering Division

updates drainage data obtained through ground survey for various capital improvement projects. All updated inventory data is used to prioritize drainage rehabilitation/replacement projects and to meet Federal NPDES MS4 permit requirements.

The National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Phase II General Permit issued by the EPA is a major component of the Town's Drainage Program. The permit, issued in August 2003, requires Towns to meet multiple objectives to improve water quality within the Commonwealth including: public education and outreach, public involvement and participation, illicit discharge detection and elimination, construction-site stormwater runoff control, post-construction stormwater management in new development and redevelopment, pollution prevention and good housekeeping in municipal operations.

Stormwater/Drainage Projects

Multiple improvements to the Town's drainage system were constructed in 2014. CPW Engineering Division designed replacements for the drainage collection systems in Powder Mill Rd., Belknap St. and Seven Star Lane for inclusion in the 2014/15 Roads Program. This included the replacement/installation of 35 drainage structures and installation of approximately 450 feet of drain pipe.

CPW's Engineering Division designed a drainage collection system replacement for the Southfield and Riverdale neighborhood. The project was bid in conjunction with water system improvements within the neighborhood and included the replacement of 41 drainage structures and replacement of approximately 0.44 miles of drainage pipe.

Lastly, for the third time in the last 4 years, CPW Engineering Division was successful in obtaining supplemental grant funding for the Town's stormwater program through FEMA's Hazard Mitigation Grant Program (HMGP). This time CPW's Engineering Division received approval for the Lowell Road culvert replacement project. The Town will receive over \$500,000 in Federal funds toward the replacement of culvert and associated drainage collection system upgrades within Lowell Road.

EPA - NPDES MS4 Permit

CPW Engineering Division completed the National Pollutant Discharge Elimination System (NPDES) MS4 Permit Year 11 annual reporting to the Environmental Pro-

tection Agency. Major accomplishments within Permit Year 11 included the preparation of a Stormwater Management Plan binder and development of the residential rain garden program. The Stormwater Management Plan binder details all of the stormwater program's best management practices and clearly organizes backup material for all work currently being employed to stay in compliance with the NPDES MS4 Permit. CPW Engineering Division is creating this SMP binder in anticipation of the new MS4 permit, as the written SMP is an expected requirement.

The residential rain garden program development was a collaborative effort between the Engineering and Water/Sewer Divisions. The program was rolled out at Junction Park April 3rd where local community members interested in participating and members of the local watershed group OARs were treated to staff discussion on the long term sustainability, water quality improvement and stormwater mitigation aspects of rain gardens. The program is aimed at gardeners within the Town to recommend the use of rain garden planting areas in lieu of standard planting beds. Rain gardens are depressions on a property laid out to collect, treat and infiltrate stormwater. The stormwater can be collected from any impervious surface (i.e. rooftop or driveway, etc.). The event was a great success and was featured within a *Boston Globe* article.

Additionally, CPW Engineering and GIS staff continued efforts to update the accuracy of the Townwide drainage system layer within the GIS to meet current and anticipated NPDES MS4 permit requirements. This inventory included surveying and GPS efforts to improve map accuracy to survey grade for all public owned drainage infrastructure. The project included the documenting/linking of all IDDE screening data, maintenance condition data and maintenance metric data to the drainage GIS layer. To date approximately 87% of the structures have had their location data updated and all structures have been inspected for condition and IDDE screening.

Lastly, EPA has reissued a draft general permit to replace the existing 2003 NPDES MS4 permit. CPW Engineering staff worked to evaluate the intricate permit in order to submit formal comments by the December 29th deadline. CPW Engineering Division also attended a permit public hearing as well as an information meeting. EPA elected to extend the comment period to February 27, 2015. In anticipation of the permit reissuance, CPW's Engineer-

ing Division has implemented many stormwater program pilots over the past few years to evaluate possible staff operational efficiencies and joint data collection opportunities to meet the new permit needs. Even with these efficiencies realized, it is anticipated that the permit as currently written, will still have significant implications that will affect staff time commitments and the Town's finances. CPW's Engineering Division will finalize the Town's comment letter in early 2015.

Bridges

CPW's Engineering Division is responsible for the management and monitoring of the five Town-owned bridges: Heath's Bridge (Sudbury Rd.), Pine Street Bridge (Pine St.), Flint's Bridge (Monument St.), Hurd's/ Nashawtuc Bridge (Nashawtuc Rd.) and Pail Factory Bridge (Commonwealth Ave.). Bridge inspections are completed every two years by MassDOT bridge staff and forwarded to CPW's Engineering Division office for inclusion into Town records and to prioritize any needed repairs. Inspections are completed to evaluate the structural condition of bridge components as well as underwater stability/erosion issues to meet National Bridge Inspection Standards. When required, bridge rehabilitation project scopes are developed and managed by CPW Engineering Division. Bridge repair funding comes from a variety of sources including: Chapter 90 State aid, local funding, State accelerated bridge program, etc.

Geographic Information System (GIS)

The GIS Program continued to implement the recommendations of the Townwide GIS Assessment and Strategic Plan in 2014. CPW Engineering Division staffed the newly created GIS Technician/Analyst position which will provide GIS and asset management support to all the Divisions of Public Works. GIS staff focused on the continued update of the GIS drainage layer highlighted in the Stormwater/Drainage section above, updating the Town's water and sewer data and the development of a new Cemetery Data layer.

The Cemetery mapping project included digitizing existing maps and linking existing databases to the GIS. The mapping was completed for the Old Hill Burial Ground in Monument Square and the Main St. cemetery at the corner of Keyes Rd. and Main St. This preliminary work is in preparation for future development of an online cemetery database tool.