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DEPARTMENT OF INFRASTRUCTURE ENGINEERING

MEMORANDUM

TO: Leon Goodwin, Town Manager

FROM: Jason L. Mammone, P.E., Director of Engineering

DATE: January 31, 2022

SUBJECT: Update of Engineering Department Projects and Activities

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The following is a brief update on some of the projects that the Engineering Department is currently working on and/or involved with:

- **2021 I/I Inspection Project** – *completed* – This project involved the cleaning & TV inspection of approximately 115,500 linear feet (21.9 miles) of sewer mains, 58 private laterals and 508 sewer manholes. The project was completed in October. The total cost of this project was approximately $320,500.

- **2021 I/I Rehabilitation Project**– *completed* – The project was designed to remove an estimated 62,000 gallons of infiltration per day and 10,000 gallons of inflow per day primarily through trenchless technologies. The project involved the installation of approximately 4,600 linear feet of cured-in-place pipe (CIPP), the installation of approximately 9 linear feet of short liners and approximately 640 vertical feet of sewer manholes cementitiously lined and exterior grouted, as well as testing and sealing of associated joints and services and manhole and sewer line root treatment. The total cost of this project was approximately $442,000.

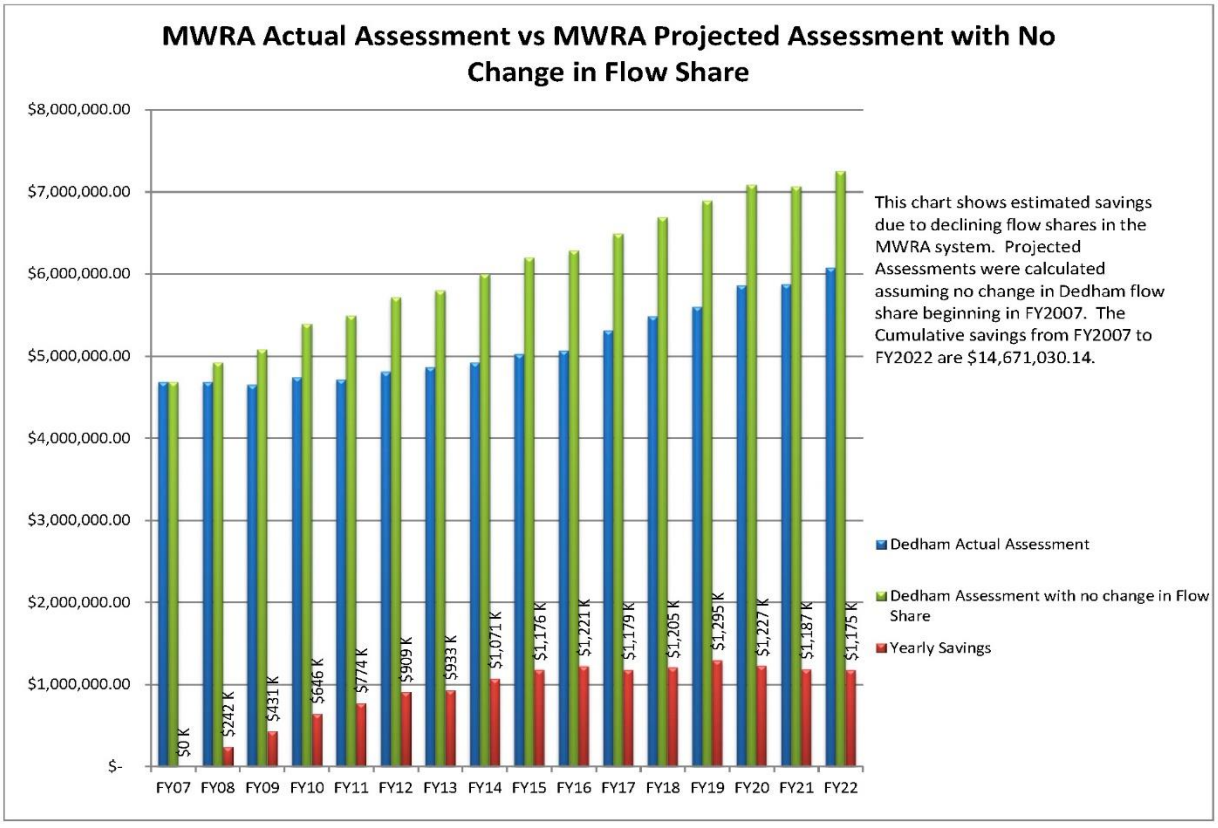
- **2021 Private Infiltration Removal Project –** *ongoing* – Back in 2020, the Private Infiltration Policy was adopted allowing us to begin this project. This was the first year for what we hope to be an annual project similar to our ongoing Inflow and Infiltration Project mentioned below. Using the private lateral inspections performed during our annual wet weather inspection projects over the past several years, we were able to develop a contract to begin the removal of identified sources of private infiltration.

  The Year 1 project was designed to remove 50,400 gallon of infiltration per day through a combination of open cut spot repairs and trenchless technologies. The project included 10 private residential properties. We were able to perform the work necessary to remove the infiltration associated with 8 of the 10 properties. The 2 properties that were unable to be completed was due to an unforeseen underground circumstance. The 8 properties that were

completed were done via the installation of a cured-in-place lateral liner installed using a similar process to how our public sewer mains are lined. All the work associated with this project was paid for through the Town's Sewer Enterprise Fund. The total cost of the project was approximately $120,000. As with any new project, we are learning many things as we go that will be used to improve our contracts for this work moving forward for the years to come. We anticipate putting out a new bid in April and will attempt to remove source of private infiltration for another 10 private properties.

- **Inflow and Infiltration Project** – *ongoing* – The Engineering Department has been working to reduce inflow and infiltration using an in-house approach to inspect, assess, design, and oversee improvements to the sanitary sewer system. Over the last fifteen years the Town has inspected approximately 2,129,000 linear feet (403 miles) of sewer main, performed approximately 7,402 manhole inspections, installed approximately 206,200 linear feet (39 miles) of cured-in-place liners, installed approximately 3,491 feet of short liners, installed approximately 203 full-wrap lateral liners, installed approximately 35 top hat lateral liners, cementitiously lined approximately 11,710 vertical feet of manholes and chemically root treated approximately 335,993 linear feet (64 miles) of sewer main. To date, the project has cost approximately $18.8 million and we estimate that we have conservatively removed 6.3 million gallons per day (MGD) of inflow & infiltration from the system. In addition, the Town's MWRA sewer assessments have remained stable and our sewer rates have remained unchanged since 2008 as a result of our decreasing flow share. Assuming a no change in flow share scenario, we estimate that Dedham has cumulatively saved $14.6 million over the past fifteen years as a result of these efforts (See Chart 1).

Chart 1



- **Nobles & Greenough School – Private Infiltration Removal –** *completed* – During our 2020 Inflow/Infiltration (I/I) project, we observed that several of the sewer pipe segments and sewer manholes privately owned by Nobles & Greenough School (N&G) that discharge into the Town's sewer system had infiltration. We reviewed all the sewer videos to quantify and locate the sources of infiltration. Based upon our review, N&G has approximately 21,500 gallons per day of removable infiltration entering the Town's sewer system. The discharge of infiltration into the Town's sewer system is prohibited and as such a violation letter was sent to N&G making them aware of the amount of their infiltration and its location within their sewer system and their responsibility to remove these sources. N&G was very cooperative and responsive to address this issue and worked with the Town continuously since our first communications.

  The identified sources of infiltration were removed under the Town's 2021 On-Call Sewer Services Contract, but paid for by N&G. The project included the installation of approximately 1,950 linear feet of cured-in-place liner and the cementitious lining of approximately 80 vertical feet of sewer manhole. The cost of the project, again paid for by N&G, was $154,754.

- **Anthony Lane Inflow Removal –** *ongoing* – During our annual wet weather inspections, we observed a suspicious connection to the Town's sewer main that runs from sewer manhole HH800 located on Anthony Lane to sewer manhole HH780 located on Washington Street. The existing sewer main between these manholes extends through 2 private properties (#37 Anthony Lane & #853 Washington Street). Upon further investigation it was determined that the existing stormwater utility that was supposed to be installed parallel to the sewer utility and connect into the State's drainage system in Washington Street, was actually connected to the Town's sewer system. The stormwater system that serves the Anthony Lane neighborhood, flows to a drain manhole located on the property of #37 Anthony Lane where it was then directly connected to the Town's sewer system.

  We calculated that an approximate amount of 500,000 GPD of peak stormwater inflow is entering our sewer system. The stormwater entering our system is being transported and treated by the MWRA at a cost to our rate payers. The inflow can also create a capacity issue for our sewer utility during significant storm events. This is a significant amount of inflow entering our sewer system that should be properly redirected to the stormwater infrastructure.

  Due to the topography of Anthony Lane and the closest location of any existing stormwater infrastructure, the easiest route to redirect the stormwater was to follow the originally proposed path being parallel to the existing sewer main and connect into the State's stormwater system in Washington Street.

  Before we could perform the design, we had to perform research at the Registry of Deeds to determine if the proposed 20' Sewer & Drain easement shown on the recorded registry subdivision plan for Anthony Lane existed on the 2 properties mentioned above. Our research, combined with Town Counsel's assistance, resulted in determining that the 20' sewer and drain easement was never formally granted to the Town. We worked with the property owners, Town Counsel and the Select Board to collect the required Grants of Easements.

The design for the new stormwater utility was conducted and completed in house this past Fall and we are now working alongside the DPW who plans to install the stormwater utility this upcoming Spring/Summer.

- **Gonzalez Field Expansion –** *completed* – Designed the stormwater system associated with proposed expansion of Gonzalez Field for Parks & Recreation which included the extension of the asphalt walkway behind the concession stand to incorporate work-out stations that could be used by those that are visiting or exercising at Gonzalez Field.

  Our department also handled all permitting with the Conservation Commission and MassDEP. The expansion was constructed and completed by the DPW in the Fall of 2021.

- **Washington Street Restriping –** *ongoing* – At the request of the Town Manager, the Engineering Department designed on-street parking spaces on Washington Street in front of the Town Hall to mitigate the lack of parking because of the ongoing Public Safety Building project.

  The design for on-street parking included 8 new parking spaces, maintained the existing MBTA bus stop location and provided reduced travel lane widths to potentially mitigate the speeds at which vehicles travel along this section of Washington Street. Of the 8 on-street parking spaces, 5 will be located directly in front of Town Hall and the other 3 spaces are located on Washington Street between Spruce Street and the entrance to Town Hall.

  The design was supported by the Select Board provided the property owner at 462 Washington Street did not object to having the 3 proposed spaces located in front of their property. The Town Manager is currently having communications with that owner to get their approval. This will be presented back to the SB following the Town Managers communications with the property owner for their approval. Should the SB approve the design, once the section of Washington Street gets repaved (Bryant Street to Spruce Street) as part of the Public Safety Building Project, the DPW will restripe this section of Washington as designed.

- **Illicit Discharge Removal – Dedham Mall–** *completed* – During our review of our 2019 Wet Weather inspections, we observed a break in the private sewer service located on the Dedham Mall property owned by at the time Wilder Companies. Upon further review it was determined that this break was located in the sewer pipe located within the culvert under the Pizzeria Uno parking lot. The sewer pipe hangs from the underside of the culvert ceiling and was allowing sewerage to enter the Mother Brook via the break in the sewer pipe. We quickly made the property owner aware of the situation and requested their immediate attention to this matter. The property owner retained the services of a professional engineer to design a repair for this break. The repair included the removal and replacement of the entire pipe segment between manholes, including the section that was exposed inside the culvert. The sewer pipe was pressure tested following installation to determine if there were any leaks. The pressure test passed and the illicit discharge was removed at the complete cost of the property owner.

- **2018 Rustcraft Road Sewer Improvements –** *completed* - At the Fall Town Meeting in November of 2018, Town Meeting approved an appropriation of $270,000 for the design of the Rustcraft Road Sewer Improvements based upon Weston & Sampson study. The Town hired Weston & Sampson to perform the design in December 2018.

In 2019 at the May Town Meeting, Town Meeting members approved $3.2 million for the construction of this improvement. Timing for this project was critical and needed to be completed by the end of 2020 so as to not interfere or potentially postpone the start of our MassDOT TIP project that started in 2021 on Elm Street and Rustcraft Road.

Weston & Sampson completed the design and specifications for the project in February of 2020. The project was put out to bid and awarded to RJV Construction in April with a bid price of $1,646,302.85. The project consisted of the installation of approximately 4,900 linear feet of 10-inch ductile iron force main, installation of force main cleanout manholes and release valve structures and upgrades to the existing pumps station consisting of the installation of 2 new submersible pumps capable of pumping 1,300 GPM. The project is being managed by the Engineering Department with construction oversight provided by Weston & Sampson. The Engineering Department provide weekly project updates and photos of the project on the Town's website. To see detailed information about the project and photos of construction please visit https://www.dedham-ma.gov/departments/engineering/projects-2123 .

Construction was completed in February 2021 with a total construction cost, including resident engineering costs, of $2,294,361.03. This ended up being $905,638.97 less than the cost estimate and what was approved for funding. The balance of the money will be placed back into the Town's Sewer Enterprise Fund to be used for future sewer capital improvement projects.

- **Town-Wide Traffic Signal Evaluation –** *completed* – Working with our consultant, BETA Group, an evaluation of our 15 Town-owned signalized intersections, 1 Town-owned pedestrian signal and 7 Town-owned flashing beacons was conducted this year. The evaluation included the collection of all the existing equipment (i.e. controller, cabinet, vehicular & pedestrian signal heads, signage, emergency pre-emption, etc.), the existing issues (i.e. wiring, loose mounts, burnt out bulbs, failed detection, etc.), existing timing & phasing plans, and crash data.

  BETA then conducted a crash analysis and collected turning movement counts during AM and PM peak hours at each signalized intersection. With this data, BETA was able to perform a crash and level of service (LOS) analyses for each signalized intersection.

  BETA then generated a report that outlined all the existing conditions and the results of their analyses and provided their recommendations on necessary repairs and upgrades to our existing signal and beacon infrastructure to ensure the Town is able to maintain reliable performance and mitigate significant failures that could result in traffic backups, crashes and/or emergency response delays. Their recommendations were broken up into short and long term recommendations and provided an outlay of the money needed to make these recommended repairs and upgrades over the next 6 years. They also recommended small changes to the existing timing and phasing plans to improve traffic flow at several intersections. Those changes have been implemented and we have seen an improvement at each intersection.

  The Town-Wide Traffic Signal Evaluation report prepared by BETA is available for download here.

- **Town-Wide Culvert & Bridge Assessment –** *ongoing* – Working with our consultant, The Engineering Corp. (TEC), an inspection and assessment of our 22 Town-owned culverts and 9 Town-owned bridge is currently ongoing.

  Following completion of the inspections and assessment (to be completed this year), TEC will produce for the Town a Culvert and Bridge Asset Management Plan. For our culverts, this plan will prioritize the culverts based upon a critical failure matrix that evaluates the probability of failure versus the consequence of failure. The top 3 culverts identified for critical failure will be provided additional detail in the assessment to include remaining service life, conceptual recommendations, and programming costs (design, permit construct).

  For our bridges, this plan will identify up to 3 priority bridge rehabilitation or replacement projects. A detailed summary will be provided for these 3 bridges to include estimated remaining service life, conceptual recommendations for maintenance and/or replacement and programming costs (design, permit, construct).

  This assessment is critical for the Town not only to prevent failures to our infrastructure and the consequences related to those failures, but to also be able to apply for Federal & State grants as they become available that would require recent assessment information performed on our culverts and bridges to be eligible. As of the date of this update, there is a Culvert Replacement Municipal Assistance Grant open for pre-RFR requests by the State's Division of Ecological Restoration (MassDER). We will be working with our consultant to determine if we have a culvert, based upon the assessment, that would be a candidate for this type of Grant.

- **Transportation Improvement Project (TIP) –** *ongoing* - In the winter of 2013/2014 the Engineering Department presented to the BOS four potential projects that could be considered a viable project for funding through the MPO TIP. The BOS selected moving forward with the sidewalk/corridor improvements for Bussey Street and Rustcraft Road/Elm Street. The Engineering Department hired BETA Group as the design consultants for the project.

  MassDOT put the contract for the Elm Street/Rustcraft Road Sidewalk Improvements Project out to bid at the end of 2020 and awarded the contract to RM Pacella, Inc. in January 2021. Construction began in June and consisted of installation of sediment and erosion control measures, tree protection, clearing and miscellaneous drainage work. Eversource also performed several gas relocations to accommodate the drainage work and the installation of a new electrical truck line to replace the existing aged infrastructure within the project limits. The project is currently in a winter shutdown and is anticipated to restart in March/April. The project is anticipated to be completed by the end of 2022.

  As for the Bussey Street Corridor Improvements Project, we are anticipating submitting the 75% and 100% design submissions to MassDOT this year along with acquiring all necessary environmental permitting. The Engineering Department is also tasked with handling the acquisition of all the temporary and permanent construction easements required by MassDOT for construction. This project has over 60 temporary easements and 2 permanent easements. The State has moved the construction schedule forward by several months and is now slated to be bid in the winter of 2022 with a start of construction set for the Spring of 2023. This project is anticipated to take at least 2 years to complete.

- **Sewer Fats, Oils, and Grease (FOG) Issues** – *ongoing* – As part of our overall inspection program the Engineering Department also has an aggressive FOG program to help eliminate back-ups and maintenance issues related to excessive grease in the sanitary sewer system. The Engineering Department has implemented a biological dosing program at key locations to help digest grease at known trouble spots.

    - **Legacy Place** – *ongoing* – The Engineering Department, in conjunction with the DPW and Health Department, has been monitoring the grease traps at Legacy Place. These grease traps have been improperly maintained to date and have been causing multiple problems at our Rustcraft Road Pump Station. We have been conducting random sampling of the grease traps throughout the year to determine if the establishments have been properly cleaning their grease traps according to their mandated cleaning schedule. When it is determined that an establishment is not cleaning their grease traps properly, the information is provided to the Health Department for their intervention. Our department will continue to monitor the grease traps to determine if the establishments are complying with the Board of Health's cleaning schedule.

- **NPDES Phase II MS4 Permit –** *ongoing* - The Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (MassDEP) issued the new National Pollutant Discharge Elimination System (NPDES) Phase II Stormwater General Permit for Small Municipal Separate Storm Sewer Systems (MS4) for the Commonwealth on April 13, 2016 and became effective on July 1, 2018. This new permit has a significant amount of requirements that the Town will be responsible for annually reporting on.

  Most of the new requirements affecting the Engineering Department pertain to Illicit Discharge Detection & Elimination (IDDE). IDDE involves the inspection and testing of our stormwater infrastructure for the presence of pollutants (i.e. ammonia, phosphorus, fecal coliform, surfactants, nitrogen, etc.). If any pollutants discovered exceed tolerable levels in our waterways, the source of the pollutant must be discovered and eliminated.

  In our Year 4 submission (due 9/30/22) the Engineering Department will be responsible for providing information and/or confirmation on the following:

    - Update as necessary our Inventory of all Town owned outfalls/interconnections with required pertinent information. Based upon our existing data we have 176 outfalls/interconnections that will require inspection and testing before the end of Year 3.
    - Continue development of a Phosphorous Control Plan
    - Develop a Nutrient Source Identification Report
    - Continue wet weather outfall inspections for High Priority outfalls
    - Continue catchment investigation for High Priority catchments
    - Update as necessary our Inventory of all Town owned stormwater utilities
    - Update as necessary all of the catchment areas responsible by the Town.
    - Assist in the development of a written Operation & Maintenance procedure manual for all municipal activities.
    - Annual IDDE training for all Engineering and DPW Staff

- Inspect all 87 Town owned Best management Practices (BMPs). Some BMPs require monthly inspections.

The Engineering Department is also responsible for obtaining the services of a consultant to assist the Town in its compliance with our permit. The Engineering Department also acts as the Town's MS4 coordinator for all the other departments that must perform work and activities that fall under their departments (DPW, Conservation, Environmental, Planning, Facilities and Parks & Rec).

For detailed information regarding the Town's MS4 permit please visit our webpage at https://www.dedham-ma.gov/departments/engineering/municipal-stormwater-ms4

- **Pavement Management** – *ongoing* – The Engineering Department, in conjunction with the Department of Public Works, has continued the pavement management program which began in 2007. Through fifteen years of the program, the Town completed approximately $25.5 million worth of repairs and maintenance to approximately 76 miles of roads and 23 miles of sidewalks. During this time the pavement condition index has risen from 70 to 81.

  In September of 2020, the Engineering & DPW department presented our next 2-year Town-wide road program to the SB. As part of our presentation, we discussed our switch in the Town's Pavement Management Program (PMP) from consultant's Vanasse Hangen Brustlin, Inc. (VHB) program to BETA's program. The reason for the switch is that BETA's PMP will be able to provide the Town with the ability to develop a more comprehensive program that will allow the Town to prioritize our rehab efforts on all of our existing roadway assets including roads, sidewalks and access ramps based upon their condition and their compliance with the American Disability Acts (ADA).

  Back in 1992 the United States Department of Justice and Department of Transportation mandated that any public agency with more than 50 employees develop and submit a 504 Transition Plan before 1995. The 504 Transition Plan requires public agencies to assess its existing Right-Of-Way infrastructure specifically utilized by those with disabilities (sidewalks and access ramps) for compliance with ADA requirements. The agencies must then develop a 3-year ongoing plan to repair non-compliant sidewalks and access ramps to be in compliance with ADA.

  The Town of Dedham developed and submitted a 504 Transition Plan in 1993 but was more geared towards addressing accessibility issues with our publicly owned properties/building rather than our sidewalks and access ramps.

  Although this plan was approved by the State a strategy for addressing our non-compliant sidewalks and access ramps was never addressed and developed to make these required improvements. It imperative that the Town correct this and develop a comprehensive plan that can be incorporated into our ongoing 3-year PMP that would be updated yearly. Every year we receive emails and phone calls from those with disabilities pointing out areas in Town where our sidewalks and access ramps are non-compliant and asking when we plan to repair these deficiencies. By combining sidewalks and access ramps into our roadway PMP, it will provide the residents of Dedham the ability to view our 3-year PMP on the Town's website and see exactly where improvements are being made and when they are

anticipated to be completed. Having a comprehensive 504 Plan will also allow Dedham to apply for various ADA grants in the future.

We should be able to include our sidewalks and access ramps into our 3-year PMP for consideration by the SB in the Summer/Fall 2021. In the Spring of 2021, BETA will inspect all our sidewalks and access ramps for ADA compliance and develop an inventory of these assets to be utilized in the PMP. Until then, we propose to finish out years 2 and 3 of the Road Program approved by the Select Board last year 2019. To view the most recent approved 2-year road program visit:

Approved CY2021 & CY2022 Road Program

- **Traffic Calming** – *ongoing* – In 2012, The SB approved the traffic calming policy created by the Engineering Department. The Engineering Department will continue to work with the SB and the Town Manager to refine and revise the policy, as needed, in order to give clear guidance to residents wishing to implement traffic calming strategies in their neighborhoods through the submission of Traffic Calming Request Forms to the Transportation Advisory Committee (TAC). The Engineering Department sits as an ex-officio member of the TAC responsible for general oversight of the committee and performing preliminary investigations consisting of traffic counts, intersection turning movement counts, and speed surveys using in-house equipment and labor.

  To date, the TAC has received and decided on twenty-four (24) traffic calming requests. The majority of the requests were determined not to require traditional traffic calming measures based upon the initial traffic evaluations performed by our department (i.e. speed tables, speed humps, road narrowing). However, for those requests that did not warrant traditional traffic calming measures, the TAC does provide low-cost traffic calming alternatives that the concerned neighborhood could implement on their own (i.e. staggered parking, step 2 kid alert). Of the twenty-four requests, only three (Lower East Street, Upland Road and Colburn Street) were determined to require traditional traffic calming based upon the results of the initial traffic evaluation. The Engineering Department generated a Traffic Calming Needs Assessment report for each of these roadways to determine what traffic calming measures would be appropriate. Lower East Street was discussed in detail in our 2019 annual report. For Upland Road we recommended temporary speed humps be installed on Upland Road and Tophill Avenue. The SB approved the installation of the temporary speed humps which were installed in June 2021. In January of 2022 a ballot was sent out to all of the property owners that abut Upland Road and all the affected property owners that live on Tophill Ave, Hermaine Ave, Pine Grove Ave and Walters Ave to ask if they want to have the temporary speed humps to remain permanently. According to the Town's Traffic Calming Policy, at least 75% of the of the property owners abutting Upland and at least 60% of the property owners on the affected roadways must vote in favor of the speed humps in order to have them remain permanently. The ballots have been requested for return by the end of January at which time they will be tallied and brough to the attention of the TAC. For Colburn Street, we recommended speed humps for Colburn Street and speed cushions for Curve Street and Maverick Street. The DPW currently has the costs associated with purchasing these traffic calming measures on their capital requests list for FY2023. Should Town Meeting approve the necessary funding, these measures will be installed in July temporarily for at least 6 months to observe their effectiveness followed by balloting the primary and affected roadways property owners.

All meeting, minutes, evaluations, and decisions are posted on the Town's website at the following link:

https://www.dedham-ma.gov/government/transportation-advisory-committee

- **Heavy Commercial Vehicle Exclusion (HCVE) Subcommittee** – *completed* – In 2020, the Planning Board received a request by Amazon for a Minor Site Plan Review for the property located at 480 Sprague Street. As the Planning Board proceeded with its hearing, residents brought up safety concerns related to the potential increase in heavy commercial vehicles, particularly semi-tractor trailers on East Street and Sprague Street. The concerns even reached the Select Board and it seemed that there were many questions pertaining to Heavy Commercial Vehicle Exclusions (HVCEs) and how they are enforced. With all the confusion and concerns surrounding HCVEs, the Select Board, in 2021, requested that a subcommittee be formed to create a public information page that could be placed on the Town's website that would provide a clear definition on what an HCVE is. The subcommittee consisted of a Select Board member, Transportation Advisory Committee member, Director of Public Works, Chief of Police and Director of Engineering.

  Over the course of several months and several meetings, the subcommittee created information including an FAQ, documents and maps that can be located on the Town's website under the Transportation Advisory Committee. This information was created to help define what a HCVE is and where we have them in Dedham. This page will be continually maintained by the Engineering Department. The materials created can be found at:

  https://www.dedham-ma.gov/government/town-management/transportation-advisory-committee/heavy-commercial-vehicle-exclusion

  Since the webpage has been created, the Engineering Department has been contacted by several other communities in the Commonwealth thanking us for putting this page together as it has been a valuable resource for them and the HCVE issues they are experiencing in their community.

- **High Street & Bussey Street Speed Study** – *ongoing* – At a Select Board public meeting held in July 2021, the Select Board listened to several residents discuss their concerns pertaining to the speeding that occurs on Bussey Street and the section of High Street from Churchill Place to its intersection with Bussey Street, Milton Street and Sawmill Lane. As a result of their discussion, the Select Board requested for the Engineering Department to perform a speed study for both roadways and apply to MassDOT to have the speed limits reduced from their current posted speed limit of 30 miles per hour (mph) to 25 mph.

  When applying for a speed reduction on a regulated roadway, we are required to follow the latest version of MassDOT's "Procedures for Speed Zoning on State Highways and Municipal Roads". We had to conduct a traffic study following the procedures that would show that a speed reduction was warranted. The biggest task when conducting a speed study is the collection of the necessary data which included gathering the number of driveways that exist along the roadway, the number of signals or controlled approaches to intersections, on-street parking activity and usage, pedestrian activity, bicyclist activity, average daily traffic volumes, vehicular speeds and crash data. Most of the information can be found using our GIS data, but the collection of vehicular volumes and speeds had to be done by a combination of manual counts using a radar gun and counts taken by a radar that

was mounted on a utility pole. After collecting all the data, it was turned into a 45+ page study that included a background, existing conditions for both roadways, presentation of the volume and speed data collected for both roadways, crash data for both roadways over the past 3 years, supporting maps and conclusion showing the need for the proposed speed reduction. This study was conducted completely in-house and took approximately 120 hours to collect the data and generate the report required by MassDOT for their review. The report was sent to MassDOT at the end of October and we are hopeful to get their decision by the beginning of February.

- **Private Ways** – *ongoing* – The Town By-laws for acceptance of private ways as public ways were updated and accepted at the 2014 Annual Town Meeting. The Engineering Department worked with the private ways subcommittee that developed the updated policy/standard by which the residents of a private way would have to adhere to in order to become a public way. The policy also includes the construction standards/specifications by which a private way must be reconstructed. There are 3 phases that must be completed and approved by the BOS in order for a Private Way to be presented at Town Meeting for acceptance as a Public Way. Those phases include the "Public Way Layout Petition Form"(Phase 1), "Acceptance of Conceptual Overlay Plan Form"(Phase 2), and Design and Layout (Phase 3). Since 2015, The Engineering Department has received 18 Public Way Layout Petitions. Of those 17 petitions, only 2 (Birch St & Quarry Rd) have been through the entire process and became Public Ways.

  Below is a summary, of the last 3 years, of those Private Ways that have requested Public Way Petition Forms from the Engineering Department and their to date progress. Please refer to previous reports for past year petitions:

  - **2019**
    - Grant Avenue – Phase 1 ongoing
  - **2020**
    - Wiggin Avenue – Phase 3 ongoing
  - **2021**
    - Karen Pines – Phase 1 ongoing

  All of these Private Ways that are ongoing in a particular phase have either stalled due to 100% of the abutters to the Private Way not agreeing to have their way become Public or the applicant is still acquiring signatures from all abutters required to move forward in the acceptance process.

- **Public Safety Building –** *ongoing* – As part of the Public Safety Building construction project, the Engineering Department has attended various meetings to discuss potential design changes associated with the sewer and drainage infrastructure. We have been on-site to perform inspections of all sewer work and the reconstruction of the 24" drain line that had to be relocated to accommodate the location of the new public safety building.

- **East Street Bike Lane Redesign –** *ongoing* – In 2011, the section of East Street from the Dedham/Westwood Town Line to the Endicott Roundabout was restriped follow our repaving of that roadway. Dedicated bike lanes, using the current guidelines of 2011, were designed for along this section of East Street by our department and installed by the DPW. Since 2011, the guidelines for designing bicycle accommodations have improved making

our current bike lane out of date. The pavement marking along this roadway has also deteriorated significantly that it is also due for a new application of pavement markings. This made for a perfect opportunity to redesign the bike lane using current guidelines. Improvements included creating a "No Parking" restriction on both sides of East Street with associated signage, dashed bike lane marking through intersecting streets and increased bike lane signage along the corridor. The installation of the pavement markings and signage is anticipated to be completed by the DPW in the Spring/Summer of 2022. The Engineering Department will also be reviewing the bike lane design for the section of East Street from the Endicott Roundabout to High Street as designed by our consultants Environmental Partners as part of our approved MassDOT Complete Street project for Eastern Avenue. This section is also to be completed in 2022.

- **MWRA's Southern Extra High Pipeline Project** – *completed* – The MWRA's project will be conducted in two phases (North and South Phase). Construction of the North Phase of the project started in December of 2017 and includes the installation of a 36-inch water line from the Town line on Dedham Boulevard to East Street. During construction, our department will be providing daily inspectional services to ensure that our sewer and drainage infrastructure remains intact. We will also be involved in attending construction meetings to stay up to date on construction activities and to address any issues to our infrastructure. The North Phase was completed in 2020. The South Phase started construction in 2019 and our department provided the same inspectional services as in the North Phase. The South Phase extended from East Street, down Rustcraft Road to the train station then under the track towards Route 128 where it will enter Westwood. The South Phase was completed in 2021.

- **Trenton Road Playground –** *ongoing* – At the request of the Select Board and Town Manager, the Engineering Department was tasked with assisting the Manor Neighborhood Association (MNA) in applying for a Notice of Intent with the Town's Conservation Commission. The property located at 96 Trenton Road was purchased by the Town in 1999 following a foreclosure. The property has become overgrown, unsightly, and unused over the past 21 years. The MNA had a vision to turn this piece of land into a neighborhood playground and began to secure donations to secure the funds necessary for design and permitting.

  A portion of the property contains wetlands and is located within the flood zone. A significant portion of the property lies within the 100' wetland buffer which also consists of a 40' Undisturbed Buffer Area. Due to the sensitive wetland and flood zone issues, the Engineering Department hired consultant Activitas with extensive experience with environmental permitting and playground design.

  A Notice of Intent and Major Stormwater Management Permit were submitted to the Conservation Commission in March 2021. After a few meetings, the Commission approved all permits associated with the project in May 2021. The project was then placed out to bid in June 2021. Unfortunately, the all the bids came in higher than what we were appropriated for funding due to an increase in materials and labor resulting from the pandemic. The DPW graciously provided their services to handle the majority of the construction work so the project could be rebid just for the installation of the boardwalk. The second bid went out in September 2021 and was awarded to Paqcon LLC. To date, the DPW has prepared the site for the installation of the playground equipment and playground surface (which have both been installed) and for the boardwalk. The boardwalk is anticipated to be installed by Paqcon in March or April 2022 followed by the landscaping

to be installed by the DPW and the MNA. The playground is anticipated to be completed by the summer of 2022.

- **Sewer Billing Project** – *ongoing* – The Engineering Department has been working with the Collectors Office to identify properties which were likely on sewer but not receiving bills using billing data and GIS information. To date 156 properties have been added to the sewer billing system. Of the 156 properties, 24 are properties located in Westwood and 3 are properties located in Boston. We are currently utilizing our sewer TV inspection data and GIS to plot locations where active sewer connections are made to the Town's system to identify additional properties that are likely connected but not receiving bills. We are hopeful in 2021 to develop another round of lettering, similar to the letters sent in 2010 & 2011 to residents believed to be connected to sewer but not receiving bills. We will be working again with the Collector's Office, Town Manager and Select Board with this effort.

- **Pump Station Operation** – *ongoing* – The Engineering Department, in conjunction with the DPW, oversees the operation of the three sanitary sewer pumping stations, including the weekly maintenance, routine and emergency repairs, and upgrades of various components. The Engineering Department and DPW monitors alarms at all stations 24 hours a day and responds as needed.

- **Sewer Connection, Extension, and Repair Inspections** – *ongoing* - The Engineering Department reviews, issues, and inspects permits for the installation and satisfactory testing of sewer lines and manholes on a daily basis. We spend a great deal of time responding to questions from residents and builders and we provide them with locations of existing facilities from record plans or television inspections. Over the past year, the Department reviewed, issued and/or inspected 49 permits. In addition to sewer permits, our department administered Drainlayer Licenses to 33 bonded and insured sewer contractors.

- **Storm Drainage Improvements/Inspections** – *ongoing* – The Engineering Department routinely responds to complaints and flooding issues throughout Town. As part of our evaluations of drain lines we have cleaned and inspected approximately 29.6 miles of pipe. In addition, we design improvements as needed. Over the past year the Town has installed 3 new deep sump catch basins.

- **Neponset Stormwater Partnership** – *ongoing* - The Engineering Department sits as one of the representatives from Dedham as part of the regional stormwater collaborative with 14 other Neponset Valley Communities. This partnership was formed through the Community Innovation Challenge Grant awarded to the MAPC and Neponset River Watershed Association. The collaborative is working together to prepare the communities for the challenges that are anticipated to arise from the new MS4 permit to be issued to the Commonwealth from the EPA.

- **Charles River Watershed Association –** *ongoing* – The Town of Dedham is 1 of 23 communities the reside in the Charles River Watershed. The Engineering Department is currently working with the CRWA to develop a strategy to remove sources of Phosphorus pollution from the Charles River. The Charles River has a Phosphorus Impairment and the EPA (as part of our NPDES Permit) is requiring us to lower the load (lbs) of Phosphorus that exists within the river to acceptable levels.

- **Subdivision and Site Plan Review** – *ongoing* - The Engineering Department reviews numerous site plans and subdivisions for consistency with Town regulations and acceptable design standards. We provide written comments to the respective boards on the adequacy of those plans and calculations.

- **Town of Dedham Construction & Design Standards** – *ongoing* – The Engineering Department is responsible for updating the Town's Design and Construction Standards. Every few years we review all the standards and update and/or revise those standards to meet local and state requirements. Our last update/revision of the standards took place in 2018.

Geographic Information System (GIS) Administration – *ongoing* - The GIS Division, led by its GIS Manager, manages the administration of the GIS for the Town. The role of the GIS Division within the Engineering Department is to respond directly to the various needs of the Town's various departments, as they relate to GIS. Some of the responsibilities of the GIS Division include database administration, software application development, generating reports, creating maps and updating the Town's geospatial data. Below is a listing of some of the projects that the GIS division has been involved with:

- **Addressing** – *ongoing* – The GIS Division is responsible for maintaining an up-to-date Master Street List and Master Address File (MAF), and for carrying out the duties contained within its regulations. This data is crucial for the First Responders, all departments, residents and the general public. The GIS division continues to add new addresses, modify and update existing addresses and solve conflicts.
- **Aerial Imagery (Spring 2020)** – *complete* **–** Prepared the specification, contracted and acquired 3" pixel resolution suitable for producing 1"= 40' scale planimetric data Aerial Photographs/Images for the Town of Dedham. The new aerial imagery was flown in mid-April of 2020 is to be utilized for updating the Town's planimetric data. New aerial imagery is recommended every 2 to 5 years. Aerial imagery is vital in providing vast amount of data at low cost. The consultant has delivered the Town-wide 4-band (color and CIR) orthophotograph with 3 inch pixels or better in June of 2020.
- **Planimetric Update (phase II)** – *ongoing* – Working with the consultant on Phase II of The Town of Dedham, MA Spring 2020 Aerial Photography and Mapping Services Project which will consist of:
    - New DTM to support creation of accurate Orthorectification
    - Set of 1-foot contours and spot elevations
    - New 40 scale Planimetric mapping features from stereo
    - Add new, modify, delete, migrate, and consolidate the existing data with the newly collected data while maintaining integrity
- **Data Integrity –** *ongoing* – The criticality of having and providing accurate data is imperative, and data integrity is key in facilitating that. Therefore, The GIS Division continues to not only conduct deep and thorough evaluation, modification, and maintenance of the existing and newly created data, but also continue to embrace and adopt the standard recommended structures by the GIS community.
- **Data Update –** *ongoing* – The GIS Division continues to update the underlying data such as parcels, road centerline, street regulation, and right of way…etc. to better represent/replicate the real world.
- **Partnership with ESRI** – *complete* –The Town's GIS Division has recently partnered and collaborated with a GIS consultant (ESRI) to work together to draft

a plan to not only leverage ESRI's latest technologies and available services, but also taking into consideration migrating the current Town wide GIS system to be in alignment with the current industry wide path going forward. The contract will end of March 2021. This project has been divided into 4 phases:

- **System migration (Phase I)** – *complete / maintenance* – Migrating all the infrastructure, GIS software, data and all supporting software needed to bring the Town with up-to-date technology.
- **Application Migration (Phase II) –** *complete* – In this phase each existing application is being examined carefully and either migrated to the new system or was replaced with a newly developed application.
- **New Application (Phase III) –** *complete / maintenance* – New application and functionality are being developed to provide both citizen and employees with tailored functionally for their specific area of need.

- **Mapillary** – *ongoing* – The Town's GIS Division has collaborated with Mapillary to provide street level images for the whole Town that is captured by the Town and to the Towns preferred accuracy. This technology allows the Town to capture its own georeferenced high-resolution images and geographically attach it the street allowing for a 3D view, this capability allows the Town to check features such as asset type, sign syntax, and visibility of structures from street which enable the Town to update its assets and data in the office instead of a site visit, which saves time and effort. First set of images capture for the Town was completed in September 2019. Second set of images was captured in August and September of 2020.
  (Please click on the **link** to access the application)
- **Department Outreach –** *ongoing* – The GIS Division continues to conduct informational sessions with individuals and/or small groups of departments' representatives to have a focused discussion and better understand their needs.
- **Department Training –** *ongoing* – The GIS Division continues to train individuals and/or small groups of departments on utilizing the GIS technology to meet their needs.
- **Departments' Special Projects –** *ongoing* – The GIS Division continues to work closely with many departments to create, and produce data, and maps that can facilitate and support their needs and decision making by migrating, modifying, evaluating, and analyzing the available information.
- **Web GIS for Town staff –** *ongoing* **–** The GIS division has been implementing cloud and web-based GIS technology called ArcGIS Online. This technology provides GIS capabilities to departments and staff that do not otherwise have GIS. These tools allow sharing and collaboration of information between departments. The GIS Division continues to develop new content on ArcGIS Online to enhance the Town's GIS.
- **Public Web/Mobile GIS –** *ongoing* – The GIS Division continues to maintain, enhance, update and publish mapping content through the Town of Dedham Maps Online application. Information is available as downloadable PDF files, web maps, and applications.
- **Infrastructure Engineering Operations** – *maintenance* – As part of the MS4 Permit the Town is required to inspect, test and monitor its outfall. The GIS Division worked closely with The Engineering Department to analyze the need, propose solutions, create data, design, test and implement a web-based application that enables the Town Engineer to report the inspected outfall in the field using any mobile device. The application allows the Engineers to report findings and monitor the inspection status on the fly. The application is designed to maintain a

historical record of the activities associated with each outfall allowing the Engineers to analyze the data and generate the needed reports and information required for the Permit.

- **Sewer Billing Project** – *ongoing* – The GIS Division has been working with the Engineering Department, Collectors Office, Department of Public Works, Dedham Westwood Water District, and Boston Water and Sewer Commission to identify properties which were likely on sewer but not receiving bills. Properties determined to be severed will be notified and billed, which will allow the Town to collect money for the services provided. In order to get to this goal, data from various departments and agencies were collected, compared, field verified in some cases, and a new set of data was generated and is being maintained.
- **Stormwater Outfall Catchment area** – *ongoing* – As part of the MS4 Permit the Engineering Department is required to submit a detailed geo-analytical report for each outfall catchment area. The GIS Division performed several data manipulation and analysis to create the outfall network, assign the related structures a unique identifier, and factor in data (geographically and tabular) gathered from other departments to generate the catchment delineation statistics.
- **Work Order and Asset Management for Public Works –** *complete*/*ongoing* **–** This project has been divided into 3 phases:
    - **Analyzing the need (Phase I)** – *complete* – The GIS Division surveyed and analyzed the Department of Public Work needs
    - **Work Order System Implementation (Phase II)** – *complete* – Working with the consultant to implement a new work order and asset management solution allowing Public Works staff to create, assign and track service requests and work orders to completion. The implementation allows DPW to track maintenance history on specific assets (e.g. sign, sidewalk, Drain Manhole, etc.).
    - **Integrating Trash Bin in the Work Order System (Phase III)** – *ongoing* – In this phase GIS Division is working closely with DPW and a its contract and consultant to locate all sites in the Town that shall be assigned a trash bin that have a unique serial number and incorporate this information into the work order to manage and maintain going forward
- **Citizen Access Service Requests –** *complete* - The GIS Division is working with DPW and its consultant to implement new applications for the public to be able to report issues and for the Department Public Works to receive, categorize, assign, resolve and manage all reported issues in a timely manner. The solution will have both a web interface and mobile application. Applications will integrate directly into the new Public Works work order management system, allowing staff to access all service requests.
- **Catch Basin Cleaning for Public Works –** *maintenance* **–** Working closely with the Department of Public Works, the GIS Division was able to analyze the need, create data, design, test and implement a web based application that empower DPW staff and contractor to inspect, collect and report Catch Basin information in real time, such as whether it was cleaned or not, by whom and when, type of pollutant (if existed), number of scoops collected, condition…etc.
- **Cemetery** – *ongoing* – Continue to maintain and enhance the data and web application for the Brookdale Cemetery. The Brookdale Cemetery web application was redesigned for better support on various tablet and mobile devices. This allows the Cemetery Division to access burial record information from the field. The same application was repackaged for the Village Cemetery.

- **Clerk** – *ongoing* – Verify and update the Town Precinct and Street List Voting data and Map. Data from Census, State voting list, Town active street name list and active addresses is being used to generate an up-to-date Street voting list and map.
- **Fire** – *ongoing* – Working with the Symposium Technologies to automate updating the Fire database with the most recent GIS data.
- **Police** – *ongoing* – Police department have adapted a new system which will require implementing new GIS processes to automate mapping the incident information from the police database. The process will provide the police and engineering department with a secured web map of incident data updated every six hours and categorized for their need. The data is also made available to other GIS users for mapping of accident or other relevant police incident information
- **Drug and Zoning Violation** – *ongoing* – To fully enforce the law, evidence must be provided. In some cases, location-based analysis and maps can be one of the essential proofs of violation. The GIS Division works with Police to generate and produce these specific kinds of maps that gets submitted to the court.
- **Police Sectors** – *complete* – Police depend on maps to identify and assign police to different sectors. Street name list and key facility locations along with police sectors were updated to produce an accurate map for the Police to use.
- **Safety - School safety** – *ongoing* – In an effort to protect against the threats that Dedham schools may encounter, and to ensure safety for all students, teachers, parents, and other individuals involved in the education system, the Police department took proactive and precautionary measures to generate safe escape routes and plans for quick and effective response. The GIS Division is working closely with the Police department to generate these plans that will be used in various scenarios for all Dedham schools. A set of plans has been produced for the escape routes for all Dedham public schools. A set of control plans for Dedham public schools has been completed and is currently working to expand the solution to the private schools and major malls in the Town.
- **Economic Development** – *ongoing* – Working closely with the departments on various projects to collect, extract, link and analyze data, and produce maps to better assist in decision making.
- **Providence Highway - Create Better Corridor** – *ongoing* – When the Town is well informed about its resident opinion, it can take the right decision that will affect the Town future, that is why the Providence Highway - Create Better Corridor crowdsource application was implemented to gather not only ideas for improving but points of shortage, categorized in well-defined groups that will be the foundation for the next step of the project.
- **Planning and Zoning**
  - **Firearms regulation, adult use overlay district** – *complete* – Firearms regulation, adult use overlay district and housing study are some of the many projects that needed the data to be collected, extracted, linked, and analyzed to better assist the department and the board in the decision-making process.
  - **Zoning Map** – *ongoing* – Working with Panning and Zoning Department and consultant to review the zoning map and identify any historical discrepancies to fix.
- **Town's Trail Inventory** – *ongoing* – Collecting, modifying, and validating the Town's Trail Inventory to better serve the resident and be able to evaluate the different areas' needs along with other projects.

- **Town's Open Space** – *ongoing* – Working closely with the Open Space Committee to collect, modify, validate, and categorize the Town's Open Space to better serve the resident and be able to evaluate the current resources and identify the needs for improvements.
- **Conservation Department** – *ongoing* – Protecting our nature is important, therefore the GIS Division is working with the Conservation Department to generate an inventory of Potential Vernal Pool and implement an application that will allow Conservation Department to collect and maintain the data and for the public to view.
- **Information Technology** – *ongoing* – Supporting and solving IT related issues during the transition period to minimize the impact on the GIS database and the availability of GIS applications and data to all of its customers.
- **Assessors** – *ongoing* – The Assessors department has migrated their system to a new technology which impacted previous existing procedures and software. The GIS Division is working with consultant to evaluate the impact and recreate new procedures and reconnect the previously connected systems to retrieve the up-to-date data.
- **Town wide Permitting System** – *ongoing* – The Town has adopted a new permitting software that shall be utilized in all Town departments. The GIS Division is working with various departments and consultant to automate generating the underlying data that the software depends on by generating this information on the fly from various databases, systems and resources residing in different Town's department.
- **State/Regional Collaboration –** *ongoing* –
    - **MassGIS** – *ongoing* - Working with MassGIS staff to provide updated standardized structure data for the Town of Dedham to the state. Standardized parcel and structure information are critical data layers for creating statewide address information to support E911 services.

- **Other notable completed projects**:

    - Private Infiltration Removal Policy (2020)
    - Whiting Avenue Restriping & Signage Plan (2020)
    - Dedham Square Pedestrian Signal Evaluation (2020)
    - Liana Estates Subdivision (2020)
    - Fox Meadow Lane Crosswalk Design (2020)
    - Gonzalez Field Sewer Design (2020)
    - Crane Street Stormwater Design (2020)
    - 106 Washington Street Sewer Extension (2019)
    - McDonald Square Sidewalk Improvements Project (2019)
    - Colburn Street Dam Project (2017)
    - Needham Street Bridge (2017)
    - Dedham Mother Brook BMP Implementation Project (2017)
    - Greenlodge School Parking Lot Expansion (2017)
    - Dedham Square Improvement Project (2016)
    - Town-Wide Flow Monitoring Project (2016)
    - Sewer System Hydraulic Flow Model Project (2016)
    - Vincent Road – Illicit Connection Detection & Elimination (2016)
    - Massachusetts Avenue Stormwater Utility Design (2016)
    - Lancaster Road/Kennsington Road Sewer Design (2016)

- 2015 Inflow Investigations (2015)
- Violet Avenue at Pine Street Intersection Realignment (2015)
- 2014 Inflow Investigations (2015)
- Striar Property (2015)
- Private Building Inspections (2014)
- Violet Avenue Drainage Study (2014)
- Gonzalez Field – Accessible Parking Design (2014)
- 2013 Inflow Investigations (2014)
- Washington Street Discontinuance (2013)
- Municipal Building Inspections (2012)
- Town Wide Inflow & Investigation & Rehabilitation Program (2012)
- Lowder Street at Highland Street Intersection Realignment (2012)
- Town-Wide Flow Monitoring Project (2011)
- Highland Street Sidewalk Design (2011)
- High/Lowder/Westfield Street Traffic Calming (2011)
- Stormwater BMP Retrofit Grant (2012)
- Lowder Street Culvert Replacement (2011)
- Cedar Street Culvert Replacement (2011)
- Colburn Street Reconstruction (2011)
- Pacella Drive Illicit Discharge Removal (2010)
- Traffic Regulations Update (2010)
- East Street Reconstruction – Phase II (2009)
- East Street Reconstruction – Lowe's Money (2009)
- Condon Park Parking Lot Design (2009)
- Bussey Street Culvert Abandonment (2009)
- Maverick Street Wall Replacement (2009)
- Zoar Avenue Sewer Replacement (2009)
- Rustcraft Road Sewer Replacement (2009)
- Gaffney Road Sewer Improvements (2009)
- Brookdale Cemetery Expansion (2008)
- Flanagan Place/Orphan Line Drainage (2008)
- Bridge Inspections (2008)
- Intersection Redesign, Greenlodge Street at Sprague Street (2008)
- East Street and Washington Street Sewer Replacement (2007)
- Street Opening Regulations Update (2006)
- Sewer Regulations Update (2006)
- Salt Shed (2006)

Cc: Select Board
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