Town and City of Groton, Connecticut

Highway Operations Comparative Analysis

Project Report

March 2019

The Novak Consulting Group

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March 14, 2019

Mr. John Burt
Town Manager
Town of Groton
45 Fort Hill Road
Groton, CT 06340

The Honorable Keith Hedrick
Mayor
City of Groton
295 Meridian Street
Groton, CT 06340

Dear Mr. Burt and Mayor Hedrick:

We are pleased to provide you with the project report for the Highway Operations Comparative Analysis for the Town and City of Groton. This report includes recommendations designed to enhance the ability of the Town and City to develop a reliable highway operations reimbursement methodology that can be leveraged in the years to come.

The recommendations contained in this report are based on the input and information provided by Town and City staff as well as identified industry standards and best practices that are appropriate to the communities. We are confident that these recommendations can serve as a framework for strengthening the relationship between the City and the Town.

Thank you for the opportunity to work with the Town and City of Groton.

Sincerely,

Julia D. Novak
President

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Executive Summary

Historically, the Town and City of Groton have a challenging history with regard to determining how funds should be allocated from the Town to the City to care for its street and highway network. Residents and business owners within the Town of Groton pay an annual property tax millage rate totaling 24.17 mills. Some Town residents also reside within the City of Groton and receive public works services from the City rather than the Town Public Works Department. The City provides public works services to City residents. The Connecticut legislature passed Connecticut Special Act No. 362 in 1933, which dictates that the Town is required to fund the City "the amount of money which shall be necessary and proper for the making or repairing of the streets and highways of said Town."

The City and the Town have been unable to agree on what continuities "necessary and proper" funding. As a result, the Town and the City have exercised the arbitration option included within the special legislation which allows a committee of three individuals, one appointed by the State Department of Transportation Commissioner, one appointed by the Groton Town Council, and one appointed by the Mayor with the approval of the City of Groton City Council, to determine the funding allocation. The most recent arbitration occurred in 2016. In 2016, the City requested $2,039,472 to fund highway operations. The arbitration findings indicated that $1.92 million was the amount necessary and proper to maintain highway infrastructure in the City.

The findings further recommended that the Town and City engage in a process to define a reliable reimbursement methodology that can be leveraged going forward. To service this recommendation, the Town and City contracted with The Novak Consulting Group to conduct benchmarking research; compare service levels and cost accounting structures between the City, Town, and peer jurisdictions; and to make recommendations that will translate into an equitable cost reimbursement methodology. In addition, The Novak Consulting Group was tasked with reviewing department operations and determining whether there were any inherent inefficiencies (e.g., staffing structures or approaches to work) that could be addressed as mechanisms to control expenses.

The Novak Consulting Group's review of the staffing and service level structures within the Town and the City indicate that both jurisdictions are reasonably staffed and structured when compared to their peers and within the context of workload demands, infrastructure condition, and service level expectations. However, there is a clear need to develop financing methodology that is based on reliable condition assessments of Town and City infrastructure as a means to more objectively clarify what is necessary and proper funding for highway maintenance activities.

To that end, The Novak Consulting Group recommends that the Town and City engage in a comprehensive asset condition assessment that can be used as the basis to develop reliable estimates regarding the capital investment needed in both communities. This assessment should be expanded to include ancillary transportation infrastructure and converted into departmental and crew work plans designed to target condition-based priorities. The work of the Town and City Public Works Departments should be tracked within work order systems so that outcome-based performance measures which clarify the differing service level standards can be provided and utilized as a basis of a funding methodology. It will take time to complete the condition assessments and work planning activities required to accomplish this goal.

In addition, The Novak Consulting Group recommends a number of accounting and operational improvements in the Town and City that are designed to generate efficiencies and ensure that elected

officials have access to the level of data necessary to make informed decisions regarding the reimbursement methodology and funding levels. Lastly, we have identified opportunities where the Town and City can begin to work together as a means to reduce expenses for both communities. The analysis and recommendations are detailed in the sections that follow.

Rec #	Recommendation
Capital Planning and Funding	
1	Update the Pavement Condition Assessment to define investment requirements based on mutually agreed upon condition goals.
2	Complete condition assessment for all ancillary highway operations infrastructure in the Town and the City.
Operations and Maintenance	
Work Planning and Performance Measurement	
3	Develop annual work plans for the Town and City that define annual preventative maintenance goals and quantifiable standards of success.
4	Utilize a work order system to track labor hours by major task.
5	Create an outcome-based performance measurement reporting process.
Town of Groton Highway Operations Cost Accounting	
6	Adopt the practice of considering full-burdened labor expenses, direct non-personnel expenses, and indirect expenses when categorizing highway maintenance expenditures.
7	Adopt the practice of billing for the full cost of paving services when provided to another municipality.
City of Groton Snow and Ice Removal	
8	Adjust the City of Groton snow and ice event treatment plan to include the application of pre-wetted salt.
Service Sharing and Collaboration	
9	Explore collaboration and service sharing opportunities between the Town and the City.

Background and Methodology

In September 2018, the Town and City of Groton retained The Novak Consulting Group to conduct an analysis of highway maintenance operations and corresponding funding allocations between the Town and City. The purpose of this study was to evaluate the methodology used to determine the Town's annual funding contribution to the City for repairing streets and highways.

To complete this assessment, The Novak Consulting Group conducted individual interviews with finance and operations staff from both the Town and City. The Novak Consulting Group completed confidential interviews with department personnel from both communities. In addition, The Novak Consulting Group completed benchmarking research in a total of 12 communities to determine how service levels and staffing structures in the Town and City align with comparable jurisdictions.

Additionally, The Novak Consulting Group requested and received data from the Town and City related to structure, operations, practices, procedures, financial structure, and workload. This information was analyzed to identify and clarify the Town's and City's service demands and service standards.

The information gathered was collated and analyzed to develop a series of recommendations that are intended to offer a pathway for the Town and City to develop a funding methodology that reflects asset and infrastructure condition and established service levels.

Town of Groton Public Works Department

The Town of Groton has a full-service Public Works Department led by the Director of Public Works and composed of seven divisions, each responsible for the execution of unique services and programs. The following five Divisions support, either directly or indirectly, Highway operations. Division descriptions are not included for Transfer Station and Water Pollution Control Divisions as these divisions do not support highway operations.

- The **Administration Division** is responsible for management and oversight of all essential public works projects and programs, including capital construction. In this capacity, specific responsibilities include the planning and coordination of projects, supervising engineering activities, information collection and analysis, and overseeing Department finances which include the procurement of services and supplies, departmental expenditures, and the processing of payroll. An additional significant function of the Division is maintaining responsiveness to citizens of the Town. The Division is responsible for responding to citizen requests for services, answering questions, and responding to resident concerns.

- The **Engineering Division** is responsible for executing surveys, studies, designs, cost estimates, inspections, and contract administration for all Town infrastructure initiatives including streets, sidewalks, bridges, culverts, sewers, facilities, and Town parks. The Division also provides support to Town boards and commissions.

- The **Facility Management Division** is responsible for operating, maintaining and cleaning approximately 400,000 square feet of Town facilities across 45 individual buildings.

- The **Fleet Services Division** is responsible for the continued maintenance and repair of all Town equipment. This includes all Town vehicles (including police vehicles) and light and heavy construction equipment. In addition to Town equipment, the Division maintains the vehicles and equipment from the Board of Education and the Groton Housing Authority. The Board of Education is billed for the parts and labor associated with providing these services.

- The **Roads and Streets Division** maintains approximately 95 center line road miles of road and street infrastructure for the Town (187 lane miles), three public school properties, and 39 acres of public parking lots. In this capacity, the Division is responsible for road and street maintenance; snow and ice removal; stormwater system maintenance for 2,568 catch basins, 11 stormwater management basins, 61 miles of pipe, 11 hydrodynamic separators, and 348 outfalls; maintenance for 640,960 linear feet of concrete and asphalt sidewalk; street sweeping; roadside vegetation control; and traffic signal and sign and signal marking maintenance.

In FY2018, the Town of Groton was budgeted 41 full-time equivalent (FTE) employees across each of the aforementioned divisions. A total of 19 FTE are allocated to the Highway Division.

The Department is funded through a combined operating budget of $16 million (including the Solid Waste Fund, Sewer Operating Fund, and Fleet Reserve Fund). The Department does not budget for the full direct and indirect cost of Highway Operations and, as a result, it is not possible to define an adopted Highway Operations budget amount. However, in 2015, the Town estimated the indirect and direct costs that apply to Highway Operations as a percentage of its total budget. The Novak Consulting Group applied the ratios

developed during that process to historical expense and 2019 proposed budget amounts to estimate the Town's Highway Operations Budget. Based on those estimates, the 2019 Proposed Budget dedicates approximately $3,037,150 to Highway operations. Those estimates are summarized below.

Table 1: Town of Groton Public Works Department General Fund Expenditure History, FY15 - FY19

PERSONNEL EXPENSES	FY 2017 Actual	FY 2018 Estimate	FY 2019 Proposed Budget
Regular Full Time	$1,169,436	$1,232,642	$1,240,003
Overtime Pay	$156,288	$154,829	$166,700
Salary Adjustments	$5,973	$6,439	$6,673
Premium Pay/Out of Class	$25,382	$24,473	$27,348
Sick Incentive	$1,427	$1,897	$1,559
Salary Reimbursement	$11,341	$10,540	$10,361
Social Security	$99,519	$107,461	$109,598
Estimated Benefit Expenses	$666,578	$702,606	$706,802
Total Personnel Services	**$2,135,945**	**$2,240,887**	**$2,269,044**
NON-PERSONNEL EXPENSES	**FY 2017 Actual**	**FY 2018 Estimate**	**FY 2019 Budget**
Postage	$1,538	$1,397	$1,538
Professional Development and Training	$1,991	$1,524	$1,991
Utilities, Fuel and Mileage	$36,238	$35,308	$36,238
Payments and Contributions	$273	$1,698	$273
Repairs and Maintenance	$51,396	$72,643	$51,396
Software Maintenance Fees	$14,155	$26,065	$14,155
Occupational Health	$43,378	$53,737	$43,378
Professional and Technical Services	$72,606	$70,143	$72,606
Materials and Supplies	$232,734	$176,080	$232,734
Vehicle Maintenance Fee	$213,937	$212,114	$213,937
Vehicle Fuel	$82,778	$81,428	$82,778
Equipment Maintenance and Furniture	$14,351	$9,978	$14,351
Computer Equipment	$2,730	$0	$2,730
Total Non-Personnel Expense	**$768,106**	**$742,116**	**$768,106**
TOTAL HIGHWAY OPERATIONS BUDGET	**$2,904,051**	**$2,983,003**	**$3,037,150**

In addition, a referendum was approved in November 2012 totaling $11,200,000 to fund pavement management activities in the three areas of the Town for the next five years. The Town's portion is $6,365,000, the City's portion is $3,542,000, and Groton Long Point's portion is $987,000.

City of Groton Public Works Department

The City of Groton's Public Works Department is a full-service public works operation that maintains the City's 28.32 center line miles (61 lane miles) of road infrastructure. The City's Public Works Department is divided into five Divisions: Highway, Sanitation, Water Pollution Control Authority, Public Buildings, and Parks and Recreation. The Highway Division is primarily responsible for all highway operations.

The Highway Division is composed of four sub-units: Administration, Roads and Streets, Fleet Maintenance, and Engineering. As such, the Highway Division is responsible for a wide variety of functions and responsibilities that include planning, surveying, constructing and reconstruction, altering, paving, repairing, maintaining, cleaning, and inspecting of highways, sidewalks, and curbs. Like most public works departments, the City's Highway Division is also responsible for roadside foliage maintenance.

The Public Works Department is staffed with a total of 30.48 FTE, of which 13.11 FTE are dedicated to the Highway Division.

In FY2019, the City of Groton Public Works Department budget totals $4,475,560. Of that amount, it is estimated that approximately $2,077,781 is dedicated to the Department's Highway Division in 2018 and $2,108,911 is dedicated to highway maintenance in 2019. The following table summarizes the General Fund budget history for the City of Groton Highway Division.

Table 2: City of Groton Public Works Department General Fund Expenditure History, FY15 - FY19

City of Groton	FY15 Actual	FY16 Actual	FY17 Actual	FY18 Budget	FY19 Budget	Percent Change FY15 to FY18
Administration	895,592	846,268	768,327	761,059	828,946	-7%
Fleet	188,746	190,354	131,622	172,092	173,707	-8%
Roads and Streets	571,233	652,627	589,405	685,126	679,205	19%
Snow	171,453	111,370	98,469	119,561	115,361	-33%
Engineering	75,104	70,882	3,875	75,869	77,032	3%
Highway Buildings	59,650	72,971	45,232	64,830	64,660	10%
Capital (Vehicles)	150,000	95,000	246,003	199,244	170,000	13%
Grand Total	**2,111,778**	**2,039,472**	**1,882,933**	**2,077,781**	**2,108,911**	**-1.3%**

Peer Benchmarking Research

The Novak Consulting Group engaged in a process of comparing The Town and City of Groton to peer jurisdictions within the State of Connecticut. The purpose of this exercise was to determine if the highway maintenance programs in the Town or City are structured in a way that fundamentally differs from comparable jurisdictions within the State and to determine if there are clear opportunities to restructure department operations to generate efficiencies.

The first step in this process was to work with representatives from the Town and City to identify which jurisdictions to compare against. Five peer communities were identified for the Town on the basis of population, square miles, road miles, and the type of services provided by public works departments. These include the Town of Branford, CT; Town of Mansfield, CT; Town of Naugatuck, CT; Town of Newington, CT; and the Town of Wethersfield, CT.

The following table summarizes the descriptive characteristics of the Town's benchmark communities. The table compares several metrics of importance including road miles, square miles of each jurisdiction, and budget information for each jurisdiction.

Table 3: Town of Groton, Benchmark Overview, FY18

	Groton (Town)	Town of Branford	Town of Mansfield	Town of Naugatuck	Town of Newington	Town of Wethersfield
Population	30,169[1]	28,111	25,969	31,392	30,423	26,195
Total Lane Miles	187.00	135.43	145.29	124.27	278.28	127.8
Total Road Miles Responsible for Maintaining	95.84	107.34	107.78	111.44	244.01	105.83
Square Miles	34.42[2]	28	45.5	16.5	13.2	13.1
Department Budget	$3,550,984	$2,492,007	$3,212,660	$5,536,804	$4,978,602	$7,999,297

A similar process was applied to determining the benchmark communities that would be utilized for the City of Groton. The Novak Consulting Group worked with representatives from the City to identify seven jurisdictions that are comparable to the City in terms of square miles and highway operations service profile. Benchmark communities for the City of Groton include the City of Derby, CT; Town of Beacon Falls, CT; Town of Essex, CT; Town of Prospect, CT; Town of Thomaston, CT; Town of Windsor Locks, CT; and the Town of Cromwell, CT.

The following table summarizes the descriptive characteristics of the City's benchmark communities.

[1] Does not include City of Groton population
[2] Does not include 3.06 square miles of the City of Groton

Table 4: City of Groton, Benchmark Comparison FY18 [3]

	Groton (City)	City of Derby	Town of Beacon Falls	Town of Essex	Town of Prospect	Town of Thomaston	Windsor Locks	Cromwell
Population	9,092	12,700	6,095	6,539	9,755	7,595	12,512	13,960
Centerline Road Miles	28.32	41.19	28.16	42.91	58.7	41.22	52.13	57.8
Lane Miles	60.6	N/A	N/A	84.0	62.5	42.0	100*	61.7
Square Miles	3.06	5.3	9.9	11.8	14.5	12.2	9.4	13.5
Highway Operations Budget	$2,077,781	$4,052,000	$794,830	$884,668	$2,154,010	$1,762,359	$2,394,182	$8,312,654

Town of Groton Benchmarking Comparisons

The following analysis compares The Town of Groton to its peer communities in six categories including operating and capital funding, staffing, highway maintenance service levels, snow and ice operations, stormwater and street sweeping, and fleet maintenance. The benchmark comparison indicates that the Town's staffing levels, service levels, and workload management approach are reasonable when compared to peer jurisdictions and within the context of local service level expectations. However, it is also clear that the Town's road improvement funding commitment is less robust than peer jurisdictions. This may have an impact on infrastructure condition and should be evaluated within the context of the infrastructure condition assessment recommended later in this report.

Operating and Capital Funding

The Town of Groton maintains a total of 187 lane miles with a Public Works operating budget of approximately $3 million. This equates to $16,241 per lane mile maintained. Among peer communities, the cost per lane mile maintained ranges between $18,000 to $62,000, with an average cost of approximately $33,000 per year. This indicates that the Town's operating budget per lane mile maintained is less than each peer jurisdiction, but that wide funding variation does exist. The following figure summarizes the benchmarking comparison for operating budget expenditures per lane mile.

[3] Lane miles data was unavailable for the City of Groton's peer communities. As a result, centerline miles are used as an alternative.

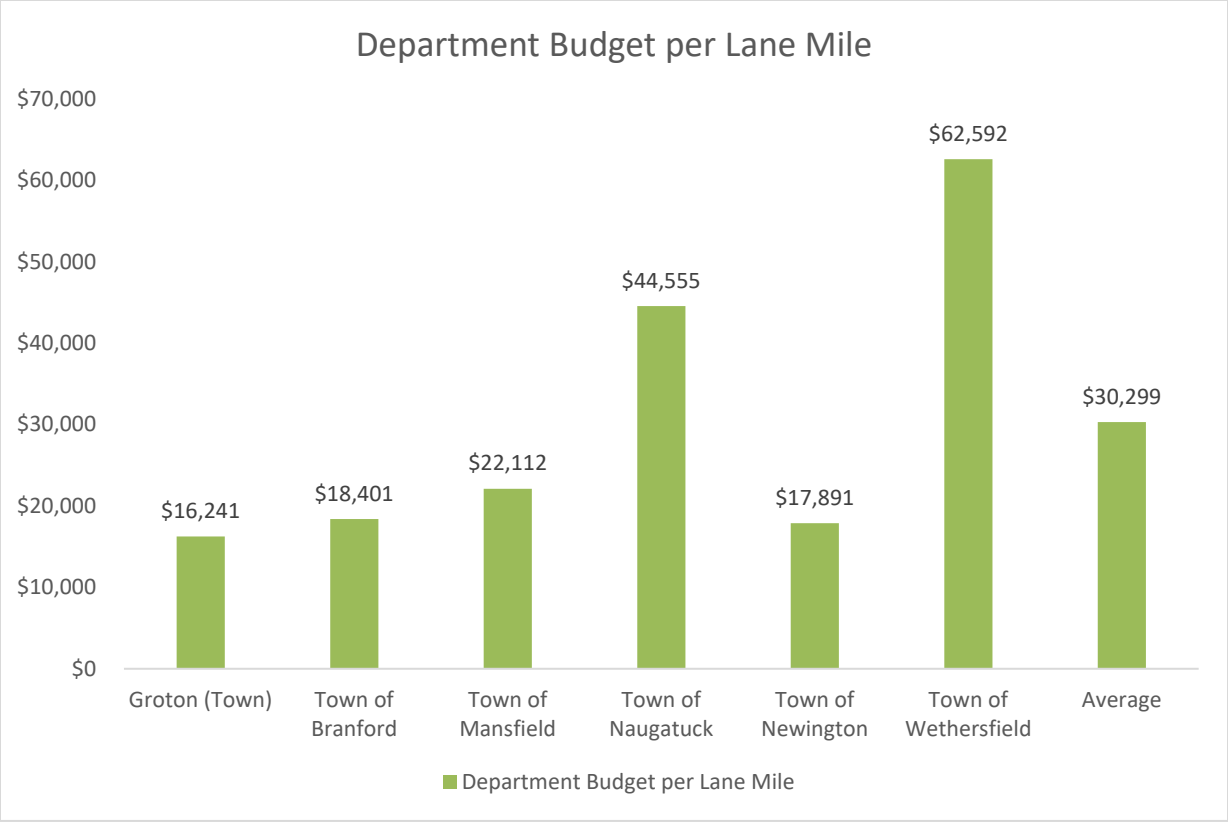

Figure 1: Town of Groton, Operating Budget Per Lane Mile FY18

It is also important to use capital funding for road improvements as an element of comparison. The Town of Groton's 2018 capital improvement budget for pavement and sidewalk repairs totaled $445,000 or $2,380 per lane mile, which is much less than the peer average of $6,309 per lane mile. Though the fundamental determining factor of capital investment need is infrastructure condition, these comparisons indicate that capital funding is much less robust in the Town of Groton than in many peer communities. The following figure summarizes the road improvement funding per lane mile in each of the peer communities.

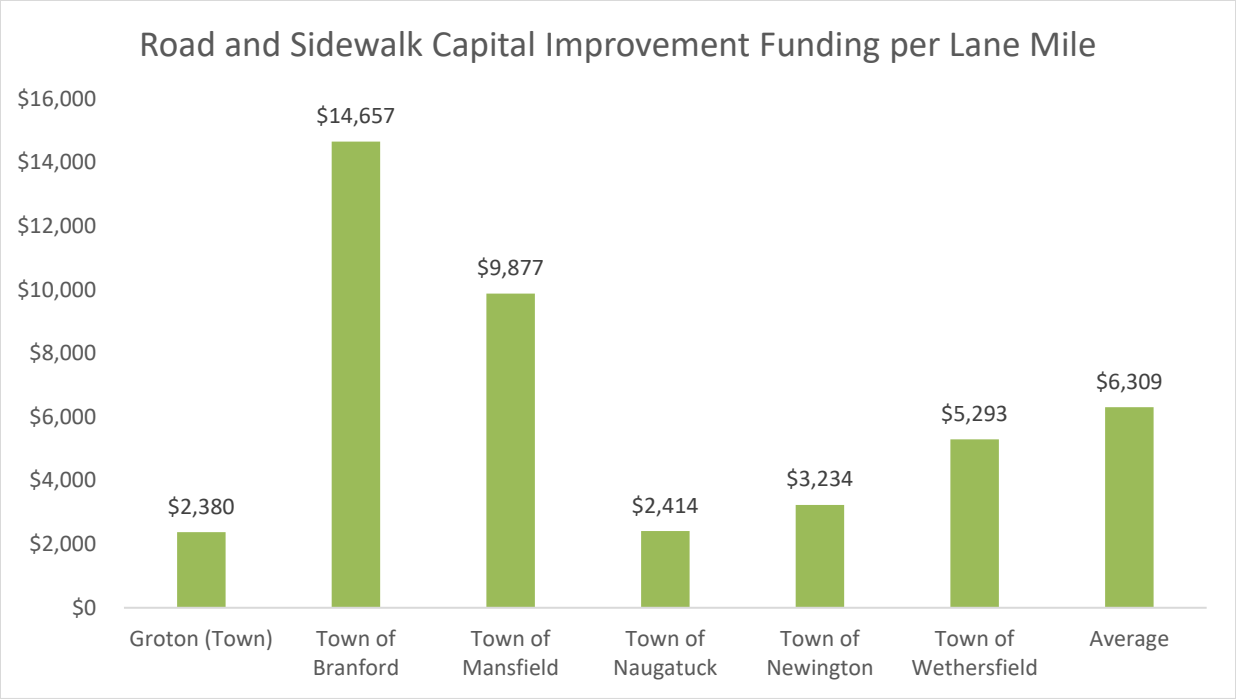

Figure 2: Town of Groton Road Improvement Per Lane Mile, Capital Fund FY18

Public Works Staffing

Staffing is an important consideration when attempting to ascertain differences in services and service levels among jurisdictions, as the number of staffing resources available dictates what workload can be effectively managed in-house. The following table illustrates the staffing composition for the Town of Groton and those peer jurisdictions where data was attainable. The Town of Groton's Public Works Department ranks second among its peers in the number of full-time dedicated employees in its Highway Division with 19.

Table 5: Highway Staffing By FTE, FY18

Highway	Groton (Town)	Town of Mansfield	Town of Naugatuck	Town of Newington	Town of Wethersfield
Highway Division Full-Time	19	11	11	14	40
Highway Division Part-Time	0	0	0	0	2
Highway Division Seasonal	0	2	0	9	3.2

The Town of Groton Public Works Department is staffed with approximately 0.10 dedicated highway maintenance FTE per lane mile. The Town ranks second among peers and is also above the peer average per lane mile, though it is important to note that staffing levels per lane mile are generally consistent across jurisdictions. Further, these staffing ratios also reflect the Town's service approach, as discussed in the following section. The following figure summarizes highway maintenance staffing levels by FTE per lane mile.

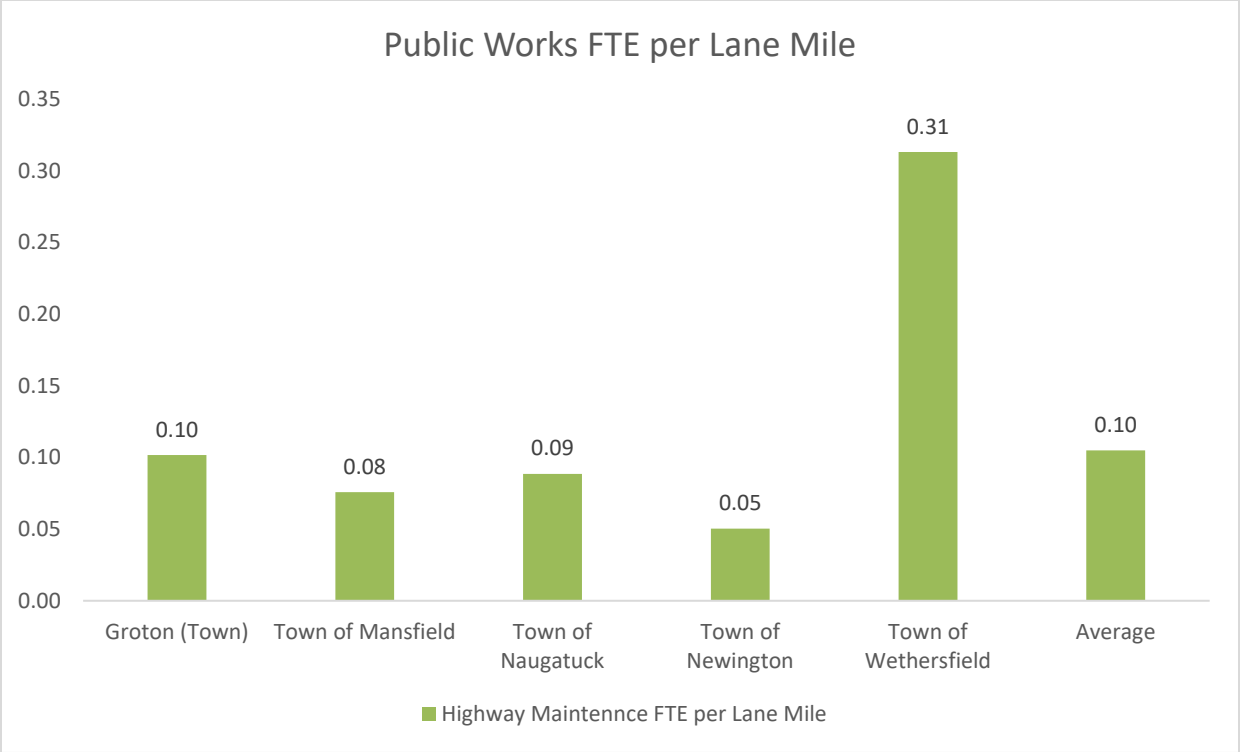

Figure 3: Town of Groton Public Works Department Staffing Per Lane Mile, FY18

Highway Maintenance Service Level

Though the Town of Groton maintains a comparable ratio of Public Works personnel per lane mile to many of its peers, the Town also provides many services in-house that other peer communities typically contract out. Most importantly, the Town contracts for milling and overlay and road reconstruction work, but provides paving with in-house staff. The following table summarizes those pavement and sidewalk maintenance functions that are provided by peer jurisdictions and whether they are contracted or provided in-house.

Table 6: Significant Functions of Road and Street Maintenance, FY18

Significant Function	Groton (Town)	Town of Mansfield	Town of Naugatuck	Town of Newington
Crack Sealing	N	Y	Y	Y
Pothole Repair	Y	Y	Y	Y
Milling and Overlay	Contract	Contract	Contract	Contract
Paving	Y	Contract	Contract	Contract
Road Reconstruction	Contract	Contract	Contract	Contract
Sidewalk	Contract	Contract	Contract	Contract

The above table provides an overview of the significant pavement and sidewalk maintenance functions performed by each jurisdiction's street maintenance division. Note that the Town of Groton is the only jurisdiction among the peer group to perform its own in-house paving. Of the three other responding jurisdictions, each of them contracts out this function. There are several reasons for this, including a lack

of internal capacity and resources, in addition to an inability to purchase asphalt below the contractor's rate.

Snow and Ice Operations

The Town and each peer jurisdiction use the "bare pavement" within 24 hours standard for snow events. Bare pavement refers to the requirement that all snow and ice must be removed from the roads, streets, and sidewalks within 24 hours of the end of a snow event.

The Town of Groton utilizes a snow route plan based upon 10 routes, which equates to approximately 18.7 lane miles per snow route. Among the peer jurisdictions where data was available, this number is the highest. Based on these figures, there is no indication that the Town of Groton has an inefficient approach to snow plow routes when considering the bare pavement standard. The following figure illustrates the average number of lane miles for each snow route within each jurisdiction where data was available.

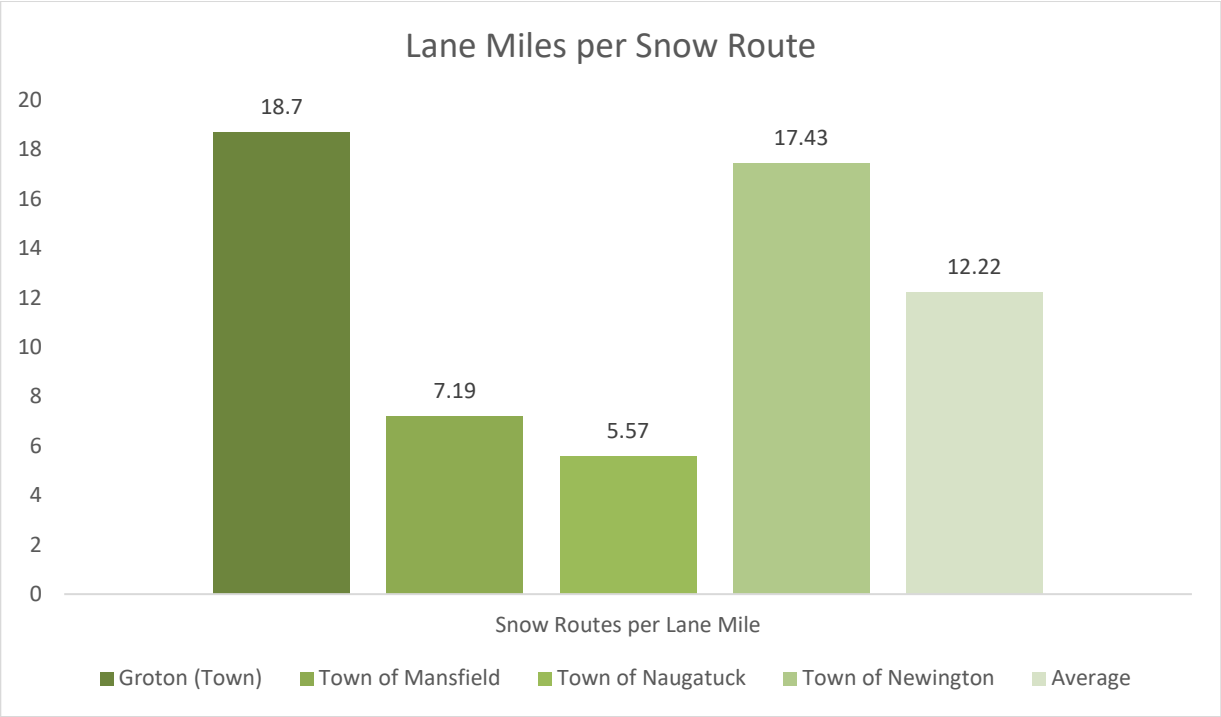

Figure 4: Town of Groton, Lane Miles per Snow Route

Stormwater and Street Sweeping

The table below compares the stormwater basin maintenance standards provided by the Town of Groton's Public Works Department to that of the Towns of Mansfield and Newington. For the Town of Groton, a total of 2,664 catch basins are within Town limits. This compares favorably to each of the peer jurisdictions regarding the types of functions carried out by staff in this area. Of the three communities where data was available, each constructs and repairs its own catch basins. The only two differences are with the Town of Newington that contracts out cleaning (each of the other jurisdictions complete this task in-house) and with crew sizes (Newington assigns four staff to catch basin functions, while Groton and Mansfield assign only two). Based on this information, the Town of Groton uses an efficient approach to stormwater operations.

Table 7: Stormwater Operations

Stormwater Operations	Groton (Town)	Town of Mansfield	Town of Newington
Total Number of Catch Basins	2664	1200	3000
Construct	Y	Y	Y
Repair	Y	Y	Y
Clean	Y	Y	Contract
Crew Size	2	2	4

Street sweeping is also an important element of effective stormwater management. The ability of a jurisdiction to efficiently and effectively clear roads and streets of debris and waste has a direct impact on its water quality and environment. The following table examines the Town of Groton's street sweeping operation and compares it to its benchmark peers.

Table 8: Street Sweeping Operations

Street Sweeping Operations	Groton (Town)	Town of Mansfield	Town of Naugatuck	Town of Newington
Number of Street Sweepings (Annual)	2	1	1	1
Crew Size	2	2	1	4

Of the four jurisdictions for which information was available, the Town of Groton was the only jurisdiction to conduct two annual street sweepings in addition to sweeping as a response to incidental weather and community events. There are a number of factors that municipalities should take into account when determining the frequency of street sweeping and catch basin cleaning. MS4 permits typically require minimum frequency for cleaning and sweeping to be once a year, but some areas should be evaluated to determine those that may require more frequent cleaning. For example, roads for traffic volumes, number of accidents (which can contribute to spills), number of catch basins, and proximity to watercourses and wetlands should be considered. In addition, given that the national average for communities to perform street sweeping is 10 times per year, the Town's service level of twice per year is not unreasonable even though it exceeds its peers.

Fleet Maintenance

The Town of Groton employs four fleet mechanics which equates to an average of 49 fleet units per mechanic compared to an average of 38 units per fleet mechanic among peers. This reflects general parity in mechanic to vehicle ratios. In addition, the Town of Groton is the only jurisdiction whose mechanics work on the full array of Town and Board of Education vehicles. Based on these factors, the Town's approach to fleet maintenance is reasonable based on service level and workload.

Table 9: Fleet Maintenance Operations [4]

Fleet Maintenance Operations	Groton (Town)	Town of Mansfield	Town of Naugatuck	Town of Newington	Town of Wethersfield	Average
Total Inventory	196	90	83	230	146	149
Number of Mechanics	4	3	2	5	6	4
Inventory Per Mechanic	49	30	41	46	24	38

[4] Inventory includes trailers and towable equipment

City of Groton Benchmark Comparisons

The following analysis compares the City of Groton to its peer communities in five categories including operating and capital funding, staffing, highway maintenance service levels, snow and ice operations, stormwater, and street sweeping. The City of Groton maintains a staff of one FTE in-house mechanic who is responsible for maintaining 25 fleet units as well as ancillary equipment such as chainsaws, tamps, rollers, trailers, and compressors. This represents the minimum staff required to provide in-house fleet support services. As a result, peer comparisons regarding mechanic to fleet unit ratios are not included in the analysis below.

Before evaluating this comparison data, it is important to note some nuances related to the City of Groton and the difficulty in locating true peer communities. The peer communities selected for comparison against the City are the most comparable in Connecticut, but the City of Groton contains the greatest density of transportation infrastructure per square mile among its peers and comprises the smallest land area, as demonstrated in the following figure.

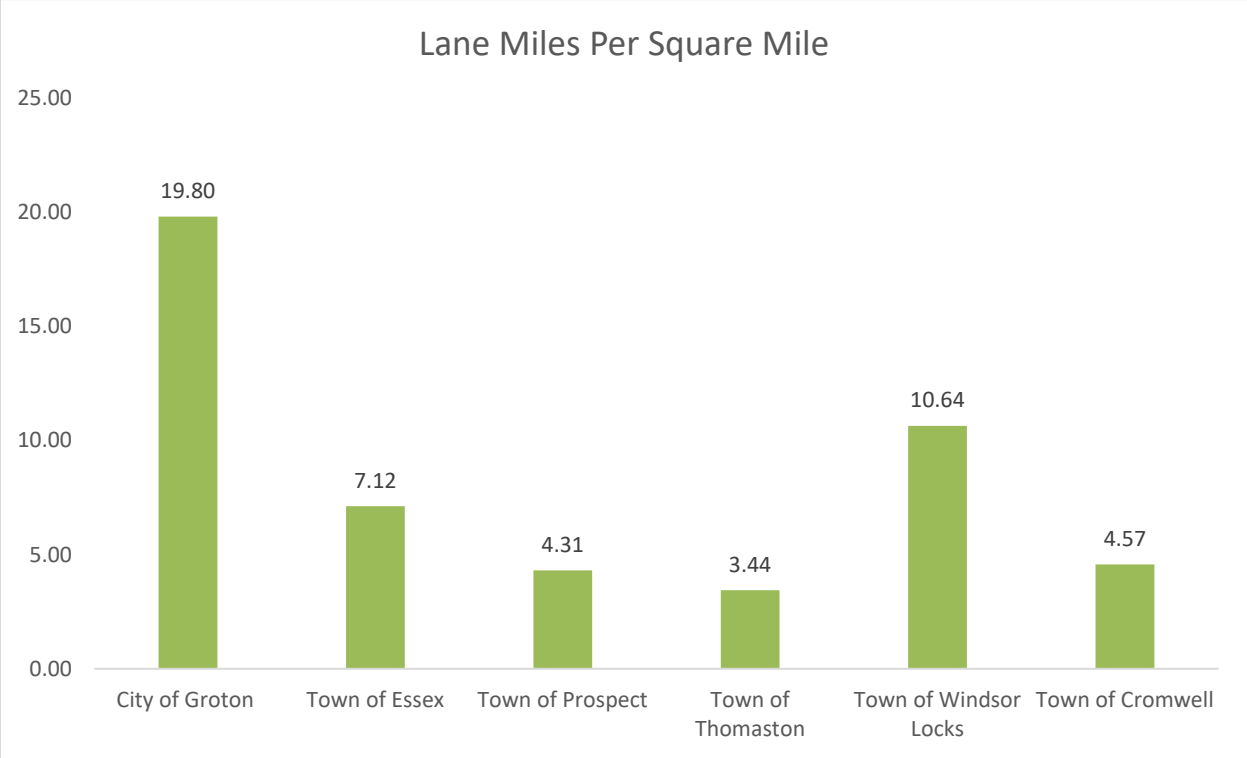

Figure 5: Lane Miles Per Square Mile

The figure above demonstrates that the City is a more densely populated, urban environment whereas many of the peers reflect a more rural environment. This density creates greater impact on infrastructure and thus greater maintenance frequency needs. In addition, as a small community, the City must maintain a certain baseline level of staff to meet service level expectations regardless of workload. These fixed costs for core staff ultimately translate into higher ratios of staff and budget expense per lane mile.

However, fundamentally, the benchmarking data summarized below and, more importantly, The Novak Consulting Group's review of the City's structure and operations, indicates that the City is not structured

in an inherently inefficient or inappropriate way. Rather, the City is structured to reflect core service levels and efficiently leverages its personnel throughout the year to effectively maintain the City's infrastructure.

Operating and Capital Funding

The City of Groton is responsible for maintaining a total of 60.6 lane miles with an annual highway operating budget of $2,077,781, including vehicle purchases. The average annual operating budget among peers totaled approximately $3.1 million. In Groton, this equates to $34,287 per lane mile compared to a peer average of $49,108 per lane mile. The following figure summarizes operating expenses per road mile for those jurisdictions where data was available.

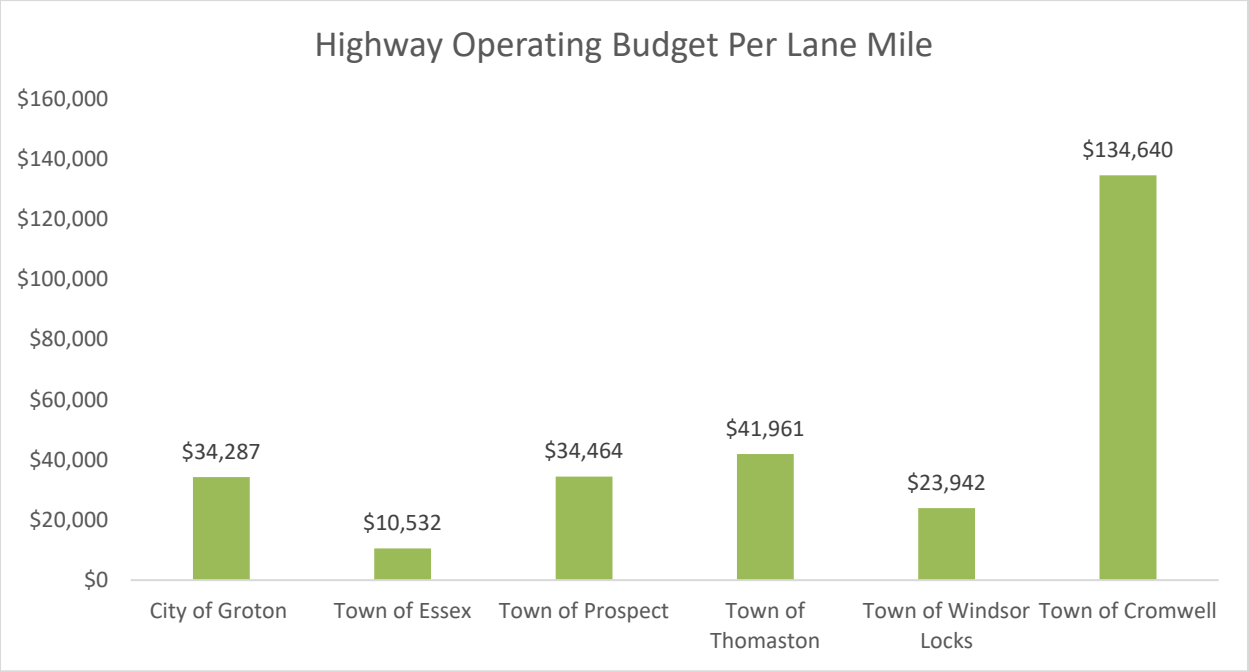

Figure 6: Operating Budget Per Lane Mile

The City of Groton is projected to spend $404,460 on highway-related capital items in FY2018.[5] Of this amount, $139,000 is slated for roads and curbing repairs. This equates to an average of $2,294 per road mile, which is less than the Town of Prospect and the Town of Cromwell but more than double the Town of Essex. However, it is again important to emphasize that capital funding needs are more appropriately defined based on the infrastructure condition rather than the funding allocated in peer jurisdictions. The following figure summarizes the road improvement funding allocations of peer communities where data was available.

[5] Capital Improvement Program for Years 2018 through 2023

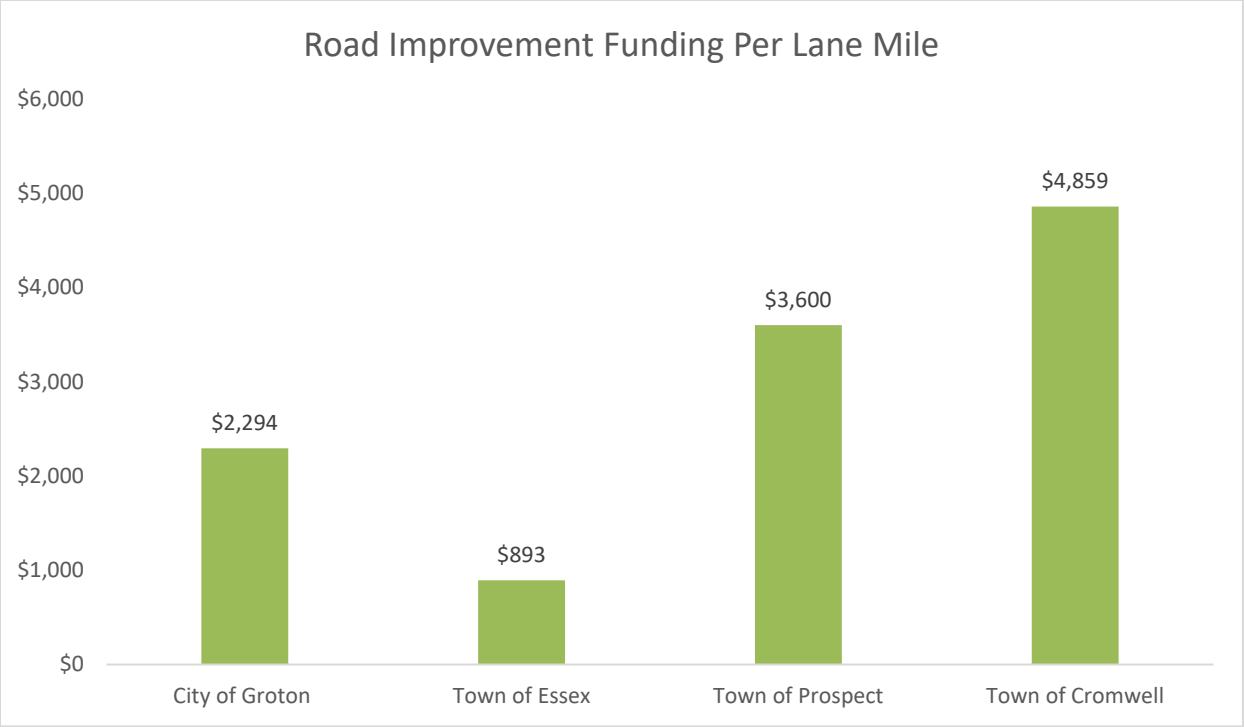

Figure 7: Road Improvement Funding Per Lane Mile

Public Works Staffing

The City of Groton Public Works Department is staffed with 18 FTE. Of this amount, approximately 13 are assigned to the Road and Streets Division, including the Public Works Director and a mechanic. As such, a total of 11 FTE are directly assigned to Highway Operations. This baseline staffing level for highway maintenance correlates closely to that of the peer jurisdictions. In the City of Groton, this equates to approximately 4.66 lane miles maintained per Roads and Streets FTE. This is the lowest ratio among available peer groups but reflects the need to maintain a core staffing level as well as the increased utilization and maintenance dictated by the City's density. The following figure summarizes Road and Streets Division staffing levels per lane mile in those peer communities where data was available.

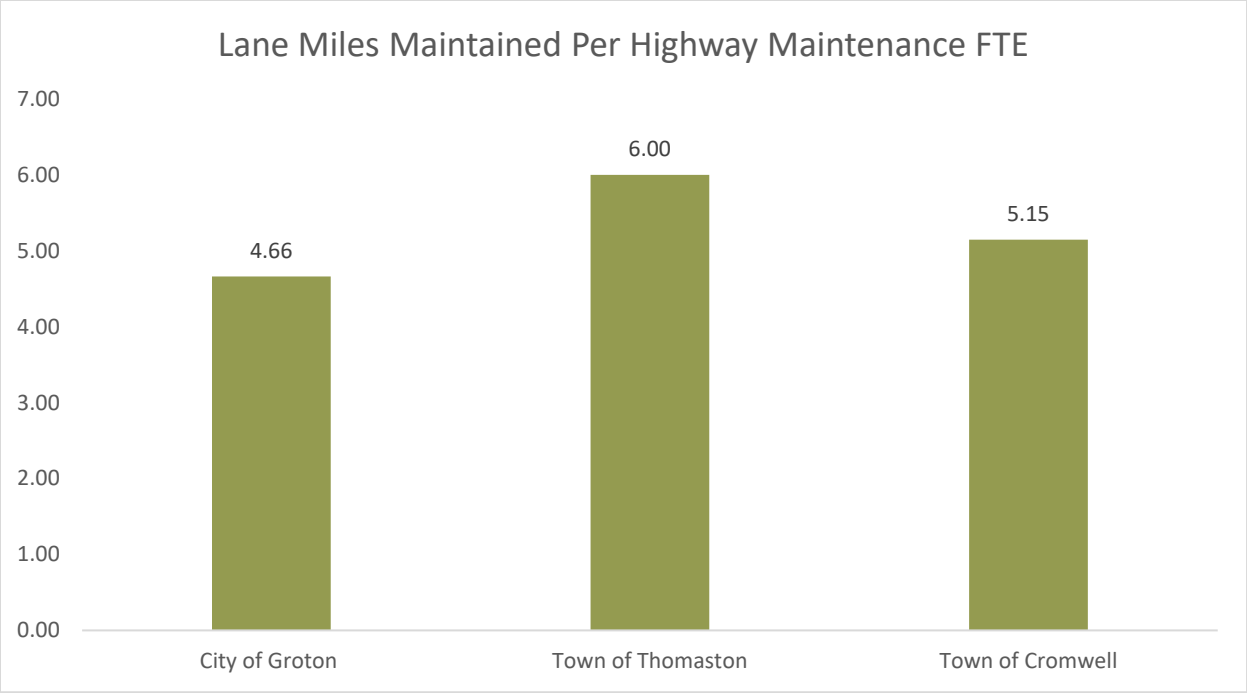

Figure 8: Lane Miles Maintained Per FTE

Highway Maintenance Service Level

The following table summarizes the core services approach reflected in the peer communities where data was available. Similar to its peers, The City of Groton contracts out for significant pavement maintenance and repair work and completes minor repairs in-house. The one notable difference in service approach relates to sidewalk maintenance and construction. The City of Groton is the only community that repairs and constructs sidewalks in-house; all other jurisdictions contract for that service. However, The Novak Consulting Group's review of City of Groton public works operations indicates that the City has developed this expertise as a mechanism to fully leverage the core staff required to maintain snow plowing and removal standards and other core maintenance standards. The following table summarizes the road maintenance service approach for those peer jurisdictions where data was available.

Table 10: Significant Functions of Road and Street Maintenance, FY2018

Significant Function	Groton (City)	City of Derby	Town of Thomaston	Town of Cromwell
Crack Sealing	Contract	Contract	Contract	Y
Pothole Repair	Y	Y	Contract	Y
Milling and Overlay	Contract	Contract	Contract	Contract
Paving	Contract	Contract	Contract	Contract
Road Reconstruction	Contract	Contract	Contract	Contract
Sidewalk	Y	Residents	Contract	Contract

Snow and Ice Operations

Similar to the Town of Groton, snow operations are a critical function of the City of Groton Public Works Department. The City of Groton utilizes five routes for their snow removal operations. This equates to a total of 12 lane miles per snow route. By comparison, the Towns of Thomaston and Windsor Locks average

eight and 11 lane miles per route, respectively. The following figure summarizes the road miles per snow route for those communities where data was available.

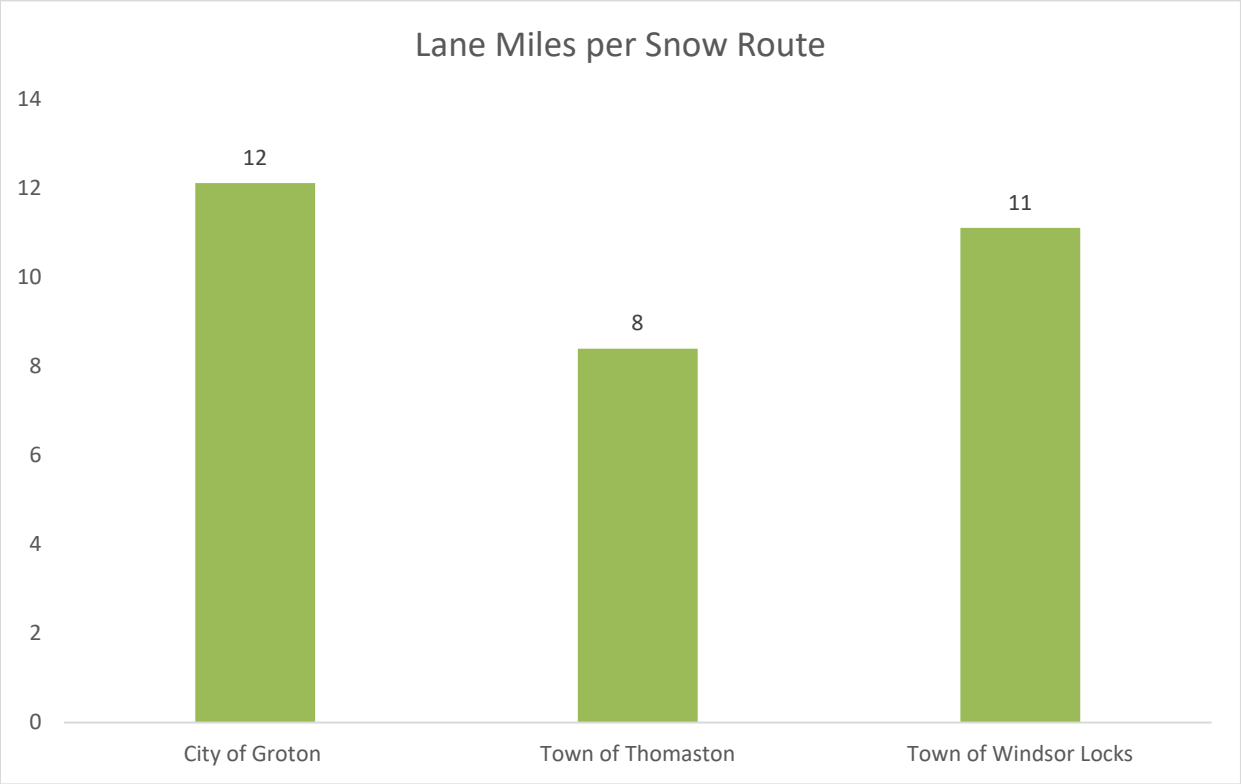

Figure 9: Lane Miles Per Route, Snow Operations

Stormwater and Street Sweeping

The City of Groton constructs, maintains, repairs, and cleans 880 stormwater catch basins using a crew of two FTE. The Novak Consulting Group's review of operations indicates that the City's approach to staffing stormwater repair and maintenance projects is reasonable and consistent with the approach applied in peer jurisdictions. In addition, the City of Groton completes street sweeping at least once per year, with additional targeted sweepings to address specific issues. Street sweeping frequency formation was unavailable for the City's peer communities. The following table summarizes the stormwater basin repair and cleaning approach among peer communities.

Table 11: Stormwater Operations

Stormwater Operations	Groton (City)	City of Derby	Town of Cromwell
Total Number of Catch Basins	880	3,000	1,100
Construct	Y	Y	Y
Repair	Y	Y	Y
Clean	Y	Y	Contract
Crew Size	1	2	5

Analysis and Recommendations

As detailed above, the Town and City of Groton are generally in line with their peer communities regarding public works department operations, staffing, and funding. However, the question remains of how do the public works operations of the Town and the City compare to one another? Fundamentally, this is a challenging question. Ultimately, the approach to staffing, structure, and service delivery approach in each community should reflect the particular conditions of those communities.

It is clear that the City and the Town are fundamentally different municipalities. The City reflects a denser, more urban composition whereas the Town reflects a less dense, mixed-density composition. However, both the City and the Town Public Works departments provide similar services to their constituents. It is useful to compare metrics between the two communities as an avenue to discuss service level and service approach similarities and differences.

When comparing the Town and City's public works operations, it is tempting to compare annual budget figures and conclude that the City is a less efficient operation than the Town. The Town maintains 187 lane miles over 38 square miles at an estimated Highway Operations operating budget of $3,037,150 million. By contrast, the City maintains 61 lane miles in just over three square miles with approximately $2.1 million budgeted for Highway operations in 2019. However, comparing budget figures does not sufficiently reflect workload requirements. Furthermore, the Town does not practice full cost accounting whereas the City has attempted to fully account for and reflect all direct and indirect road maintenance expenses in its budget figures. For example, if personnel from the sanitation operation support highway functions during a portion of their work week, a portion of their salary and benefit expenses is allocated to the Road Maintenance budget. This is a practice that should be adopted by the Town and is recommended in this section of the report.

In the alternative, the more important areas of comparison relate to core staffing requirements, workload demands, infrastructure condition, and service level expectations. When considering service level and core staffing requirements, the common denominator between both the Town and City's public works operations is their snow and ice removal operations. Both jurisdictions structure their crews and determine their staffing size based upon their individual "snow plans" or their ability to efficiently and effectively clear snow and ice from roads, streets, and sidewalks within 24 hours of the end of a snow event. The work performed outside of winter months is organized by workload demand and in consideration of what can be most efficiently performed given the capacity and skills of "core" staff during this time as well as the infrastructure composition and condition of each community with this core staffing level. The Novak Consulting Group's review of the organization structure, crew staffing levels, and deployment approach finds that there are no clear indications that staffing levels should be reduced. Rather, the more critical exercise will be to define actual investment requirements within the City and the Town and develop a funding strategy that reflects infrastructure condition and the unique demands of each community.

The Town and City of Groton are fundamentally different communities – one is more closely described as mixed while the other is more appropriately described as urban. The differing service level expectations, infrastructure types, and infrastructure utilization in these communities necessitate different maintenance and capital funding approaches. As a result, it is not realistic to assume that the approach in one community should strictly match the approach in the other. However, there are opportunities to create greater parity and value for the residents of the Town and the City.

The Novak Consulting Group's review of the Town and City's highway maintenance operations, as well as benchmarking comparisons among peer communities and between the Town and City, have yielded recommendations in three primary areas: 1) Capital Planning and Funding; 2) Operations and Maintenance, and; 3) Service Sharing Opportunities. The recommendations are detailed below.

Capital Planning and Funding

Recommendation 1: Update the current Pavement Condition Assessment to define investment requirements based on mutually agreed upon condition goals.

Two primary expenditure types must be taken into account when considering highway funding needs: 1) capital expenditures and 2) operating expenditures. These are primarily differentiated by two characteristics: dollar amount of the expenditure and the useful life of the asset acquired, constructed or maintained. Capital expenditures will enhance, acquire or extend the useful life of assets through a variety of activities. In the case of the Town and City of Groton, capital expenditures include the design, construction, and rehabilitation of highway infrastructure. Typically, capital investments will have a useful life of 10 years, significantly extend the useful life of an asset, or significantly alter the nature and character of an asset.

A maintenance capital program is designed to protect municipal assets from premature failure and to minimize and eliminate unnecessary risks and loss to the municipality. An effective maintenance capital program ensures that existing capital assets are maintained in reliable, serviceable condition without requiring capital appropriations that vary significantly from year to year.

Maintenance capital programs consist of non-expansion projects. Non-expansion projects are those that do not change a footprint of an asset, expand a current asset, provide resources for services not already undertaken, or increase the operating budget once complete. For example, street paving is funded to maintain the condition of the Town and City's highway infrastructure, but it would not fund the construction of new turn lanes or travel lanes.

The Town and the City have limited funds available to fund the capital improvement program. The Town and the City determine which roads to include in the annual capital improvement plan budgets using information derived from a pavement condition assessment completed in 2007 and input from maintenance personnel, and was used to inform the 2012 bond referendum for street repairs. This assessment is over 10 years old and should be updated to reflect the current condition of Town and City infrastructure.

Most pavement condition assessment systems rely heavily on a rating of the physical condition of a street called the Pavement Condition Index (PCI). This PCI is obtained from a field inspection of every square yard of street surface by the technician who measures both the quantity and the type (severity) of distresses in the pavement. This evaluation is done in accordance with a uniform rating manual. Pavement rating programs then compute these field measurements and establish a PCI number (0-100), which is a comparative rating to new pavement (100). The following figure illustrates the pavement condition to age curve and the relative impact of preventative maintenance as a tool to extend the life of City roads.[6]

[6] Stevens, L.B. "Road Surface Management for Local Governments – Resource Notebook." Federal Highway Administration, May 1985.

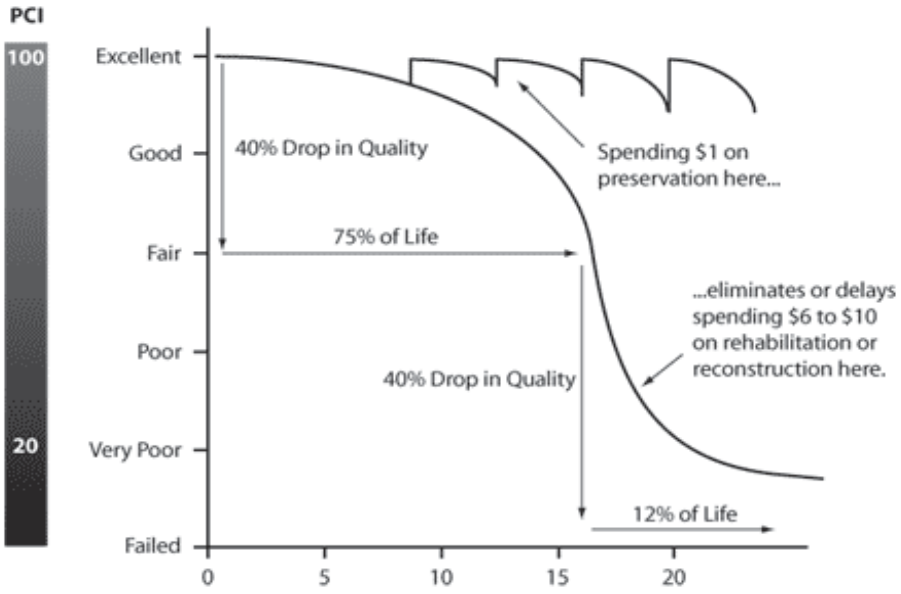

Figure 10: Pavement Condition to Age Curve[7]

The pavement condition assessment should identify the pavement rating of each Town and City street. Further, the scope of the pavement condition assessment should be expanded to specifically identify annual funding requirements to achieve and maintain the very good, good, satisfactory, and fair PCI categorizations for all transportation infrastructure. It should further define the annual capital investment required to eliminate the investment backlog under each PCI category goal over 10 years or maintain the backlog at its current level.

From here, the Town and City will be able to determine what highway condition can be achieved under the current maintenance capital program funding level and will be equipped to determine if additional funding should be generated to elevate the condition of both Town and City streets. This condition-based service level discussion should serve as the framework for capital funding going forward. This condition assessment should be updated on a five-year cycle, with one-fifth of the Town and City's infrastructure re-inspected on an annual basis.

Recommendation 2: Complete condition assessment for all ancillary highway operations infrastructure in the Town and the City.

Developing condition assessments of the roadways within the Town and City will provide clear investment parameters to maintain or enhance the condition of existing roadways. However, additional infrastructure items fall within the rubric of highway operations. For example, the Town and City maintain traffic signs, stormwater systems, rights-of-way, street lighting, traffic marking, guardrail systems, bridges, culverts, and sidewalks. Asset inventories and condition assessments should also be completed for these assets. Useful asset inventories should include baseline workload data (e.g., number of street signs, number of street trees, linear feet of right-of-way maintained). For assets that require replacement, the age and expected life cycle of the asset should also be documented in the inventory. This is critical for both work

[7] USDOT Pavement Preservation Compendium II, Principles of Pavement Preservation: Definitions, Benefits, Issues, and Barriers

planning and capital replacement planning. For example, in order to develop a multi-year replacement plan for traffic signs, the Town and City need to understand which signs need to be replaced and when, based on recommended life cycle.

The first step to completing this work is to assess the condition of existing infrastructure and to develop a preventative maintenance work plan and capital budgeting process that apply best practices approaches to maximize the useful life of Town and City assets.

Conducting a detailed assessment of asset condition and, more importantly, systematizing the process of assessing infrastructure on an ongoing or cyclical nature is a significant task. As a result, it is important to prioritize what work can be completed in-house and what work should be contracted. Most condition assessments and inventories will require a significant initial investment of time. However, once the initial assessment is completed, the inventory can be effectively and efficiently maintained with a functioning work order system. It is estimated that this study will cost between $50,000 and $100,000 to complete for all roadways, curbs, sidewalks, ADA ramps, and ancillary transportation infrastructure.

Operations and Maintenance

Work Planning and Performance Measurement

Recommendation 3: Develop annual work plans for the Town and City that define annual preventative maintenance goals and quantifiable standards of success.

The next important step to improve work planning is to include asset condition assessments in target preventative maintenance work plans. These work plans should focus departmental efforts to utilize maintenance as a means to defer the need for total replacement. Using condition assessments, the Town and City must project core maintenance activities over a five-year period, determine what can be effectively managed with in-house personnel, and what needs to be contracted to the private sector. This activity will identify the existing service level in each core highway maintenance area based on the availability of resources and will allow the Town and City to quantify the gap between available resources and needs defined in the condition assessments recommended above.

Currently, crew work is planned from institutional knowledge and visual assessments conducted by the Town and City Public Works Directors and is informed by the 2007 pavement condition assessment and input from maintenance staff. The Public Works Directors develop a list of maintenance work that they would like to complete then finish that work as time allows. One major problem with this approach to work planning is that it relies too heavily on institutional knowledge. As personnel change or responsibilities are transferred, critical maintenance responsibilities can too easily fall through the cracks. In addition, the current work planning approach is focused on addressing issues as they arise. In other words, issues are addressed when they become a problem rather than before there is a problem, which is a reactive approach.

With the development of accurate asset inventories, the Department will be in a better position to define the maintenance cycle of the assets that the Town and City Public Works Departments are responsible for maintaining and to develop annual preventative maintenance work plans. For assets that require sporadic maintenance over a period of years (signs, trees, etc.), it will be important to develop annual work plans that are structured to cycle through the entire Town and City over a period of years. The overall maintenance cycle should be reasonable within the context of resource constraints. For assets that require more direct and consistent attention, such as road repairs, the annual work plan should include

larger scale projects to be completed throughout the year to address issues (e.g., crack sealing programs) in addition to daily activities.

The Novak Consulting Group's review of the workload requirements and organization structure of the Town and City Public Works Departments as well as benchmarking analysis suggests that both the Town and City Public Works Department are not overstaffed to meet their workload demands. In addition, the resources required to meet these service standards are generally effectively used throughout the year to maintain broader asset conditions. However, with the development of up-to-date and comprehensive asset condition assessments as well as long-term investment requirements, the Town and City will be able to more precisely define the staffing and contracted service requirements for both communities.

The evaluation of staffing levels and contracting opportunities in public works departments is driven by two primary factors: 1) service level and 2) task time. The defined service level for a particular function dictates the frequency of the work to be completed as well as the amount of time required to complete that work. For example, right-of-way mowing in the Town is a seasonal activity, typically requiring service between the months of April and October. In a hypothetical mowing, we assume that it takes a crew of two FTEs 40 hours to mow the entire right-of-way inventory. This equates to a task time of 80 labor hours per completed task. If the adopted service level is to mow the right-of-way inventory each week, the monthly task time required is 320 hours per month. If the adopted service standard is to mow the inventory bi-weekly, then the monthly task time required is 160 hours per month. This task time can be applied to a fully burdened labor rate and related non-personnel expenses to determine a cost estimate for service.

To conduct this type of assessment, clear maintenance work plans and service standards must be established to determine what resources are needed to meet the requirements of the work plan. Just as importantly, these standards can serve as an evaluation tool that can be used to determine the ongoing operating and maintenance costs associated with adding new infrastructure.

For example, assume that a municipality maintains an inventory of 50 traffic signal mast arms. Based on anticipated life cycles for a paint job, an acceptable service standard would be to paint each mast arm on a seven-year cycle. By identifying the average number of labor hours required to paint a signal mast arm and pole, the municipality can estimate the total number of annual labor hours and FTEs that would be required to achieve the established service standard and determine the estimated salary and benefit cost associated with completing the activity. This cost data, along with anticipated non-personnel expenses such as paint, equipment use, and fuel, can be used to evaluate the cost effectiveness of maintaining an annual in-house light pole painting program or contracting the service out every five years. Further, it can be used to determine the funding requirements to meet maintenance and replacement cycles identified in the aforementioned condition assessments.

This approach can be applied to any highway maintenance activities and can be used to evaluate the impact that resource adjustments will have on service standards. Just as importantly, the establishment of target work plans and service standards will further the Town and City's effort to place greater emphasis on preventative rather than reactive asset maintenance.

The following table provides hypothetical work plan calculations for storm water basin cleaning and pavement crack sealing to further illustrate the methodology.

Table 12: Hypothetical Work Planning and Resource Identification Template

Work Activity	Service Standard	Infrastructure Inventory	Average Labor Hours Required to Complete Work Activity	Annual Labor Hours Required to Meet Service Standard
Storm water basin cleaning	Inspect each segment of stormwater line every five years	35 storm water basins	1 hour per basin cleaned	35
Pavement crack sealing	Crack seal 20 center lane miles of pavement per year	40 center lane miles of street	15 hours per center lane mile sealed	300

These work plans and service standards should be incorporated into a work order system and used as a basis for comparison against actual experience to ensure that standards are appropriately assessed, to monitor work plan progress, and make adjustments to staffing levels or assignments as necessary to meet work plan requirements.

Recommendation 4: Utilize a work order system to track labor hours by major task.

Currently, the Town utilizes the Hansen 8 work order system as a mechanism to track and expedite service requests. In addition, the Town is currently implementing the Munis Enterprise Resource Planning (ERP) system and is evaluating how to integrate the asset management module into public works operations. However, the work order system is not utilized to track labor allocation by major activities (e.g., snow plowing, road maintenance, paving). The City of Groton has adopted a practice of tracking labor hours and equipment usage by major task, which serves as the basis of funding requests each budget year. One of the limiting factors that has precluded the Town and City from accurately comparing service standards and costs is the lack of unit cost data. This level of measurement is required to effectively compare the outputs and costs of Town and City operations. Going forward, it will be important to collect this information consistently between the Town and City so unit-based performance measures can be developed and evaluated by executive managers and elected officials. It is also important to document and analyze how crews are spending their time on an ongoing basis.

By more effectively utilizing the Town's work order systems, the Town and City to track labor hours by major activity (e.g., pavement maintenance, sidewalk repair, right-of-way mowing). This will allow the Town and the City to ascertain the time commitment and cost required to meet service level and repair needs identified in the condition assessment process. It is important to note, however, that the intention of this recommendation is not to require employees to track their time in a manner consistent with billable professions. Employees would not be expected to document time by specific activity (e.g., oil change, vehicle inspection). Rather, front-line workers, as part of the work order completion and data entry process, should reflect the labor hours spent on major activities.

Work order systems also help organizations track the time and materials dedicated to completing work orders. Tracking employee time helps organizations understand the distribution of scheduled work and reactive work completed by staff and it enables organizations to develop activity-based accounting. Activity-based accounting is useful when making service-level decisions or evaluating opportunities to contract out services. Work order systems that are integrated into GIS systems enable organizations to map work orders and associate them with assets, which can then be integrated into pavement and condition assessment data recommended above.

Implementation of an electronic work order system and associated business processes would better enable both municipalities to monitor the completion of preventative maintenance work, complaint-driven work, and emergency work. It would allow for regular, holistic analysis of Town and City workload and will allow both municipalities to better quantify whether service expectations are being met and, if not, to respond in a proactive manner. It is important to keep the tracking of employee time from becoming overly burdensome. Therefore, categories should be relatively broad, focusing on asset type and maintenance type (preventative or reactive) rather than detailed activities. Approximately 30 to 50 categories may be necessary. The following list includes some examples of possible categories of activities:

- Stormwater basin repair and cleaning
- Street sweeping
- Line painting
- Pavement maintenance
- Repaving
- Sidewalk repair
- Sidewalk construction
- Sign repair and replacement
- Right-of-way mowing

The cost of work order systems can vary based on features and licensing; however, an initial cost estimate can range from between $50,000 and $100,000, plus licensing expenses.

Recommendation 5: Create an outcome-based performance measurement reporting process.

The Town and City Public Works Departments currently lack a culture of rigorous data collection, analysis, and performance measurement. Limited data is available that identifies how efficiently and effectively each Department carries out its work plan. Rather, the success of each Department is measured by anecdotes and perception. It is important to note that the absence of a rigorous performance measurement program does not imply that the Departments are performing poorly. On the contrary, The Novak Consulting Group's review of each Department indicates high competency, professionalism, and commitment. However, a rigorous performance measurement program would enable each Department to evaluate service quality and carry successful service forward to the next level. It will also provide policy makers with reliable data with which to compare outcomes generated through Town and City Public Works services.

Performance measurement is a tool that can be used to quantitatively evaluate program performance, make ongoing assessments, and guide regular program improvements that are responsive to evolving conditions or resources. In addition, implementing a performance measurement program in the Town and City of Groton will enable both communities to quantify what level of service is provided under current operations. This is the first important step to identifying and developing service standards and evaluating whether additional resources are needed to meet those standards. The development of asset inventories, annual departmental and crew work plans, and an electronic work order system will all support the implementation of a performance measurement program.

The work order system recommended above will collect data on the activities planned and completed, enabling each department to track and assess performance against established performance goals. The Public Works Directors will be able to make more informed choices about service and staffing levels. Performance metrics also support a dialogue between management and employees, ensuring that the work completed by employees is in line with the expectations set by the Town and City. The following

summarizes the key performance metrics that should be tracked and reported by the Town and City of Groton and used as a basis for service level comparison.

Table 13: Recommended Performance Measures

Category	Performance Measure
Stormwater basin repair and cleaning	• Number of stormwater basins cleaned per 100 labor hours • Number of catch basins cleaned per 100 labor hours • Number of catch basins cleaned • Cost per 100 catch basins cleaned • Cost per 100 catch basins constructed
Street sweeping	• Linear feet of street sweeping completed per 100 labor hours • Cost per linear foot of street sweeping completed
Line painting	• Cost per 1,000 linear feet of traffic line painted
Pavement maintenance	• Percent of Highway Maintenance staff labor hours applied to pavement maintenance • Cost per ton of asphalt applied
Repaving	• Cost per square yard of asphalt applied
Sidewalk repair	• Cost per linear foot of sidewalk repaired
Sidewalk construction	• Cost per linear foot of sidewalk constructed
Sign repair and replacement	• Cost per 100 signs replaced, by sign size/category
Right-of-way mowing	• Cost per 1,000 linear feet of right-of-way maintained
Snow and ice removal	• Cost per snow event

Town of Groton Highway Operations Cost Accounting

Recommendation 6: Adopt the practice of considering full-burdened labor expenses, direct non-personnel expenses, and indirect expenses when categorizing highway maintenance expenditures.

One of the prevailing complications that has limited the Town and City's ability to reach agreement on the amount of highway maintenance revenue that the Town will provide to the City relates to the approach to calculate and define highway maintenance expenditures. The City has adopted the practice of including fully-burdened labor expenses (e.g., salary and benefits), direct non-personnel expenses, and indirect cost estimates in their calculations. The Town does not include benefit expenses or indirect cost estimates in their calculations of highway operations costs.

Indirect costs go beyond the expenses associated with specifically performing highway maintenance activities to include the price of maintaining the pool of personnel and non-personnel resources required to deliver these services. These overhead costs are the ones left over after direct costs have been computed. For example, the materials and supplies needed for day-to-day operations and administration are examples of indirect costs. These include items such as cleaning supplies, utilities, office equipment rental, desktop computers, and cell phones. While these items contribute to the municipality as a whole, they are not directly assigned to the delivery of highway maintenance functions. However, these expenditures are ultimately required in order to deliver the service and should be reflected in the cost estimates. Further, the employee benefit expenses of those employees who are responsible for delivering highway maintenance services are a true cost of delivering service and should be reflected by both municipalities.

Recommendation 7: Adopt the practice of billing for the full cost of paving services when provided to another municipality.

The Town and the City perform many of the same functions, just on different scales. For example, the Town and City both perform street sweeping, line painting, and minor roadway repairs. There is, however, one area where there is a fundamental difference in specialization. The Town has developed an expertise in road repaving and maintains the equipment necessary to conduct Town paving projects as well as projects for other municipalities. The City contracts for repaving work and has developed masonry expertise that they direct toward concrete and sidewalk repairs. Though the Town provides some paving services to other municipalities, it does not currently charge for the labor associated with the service. Only non-personnel expenses are reimbursed for the work. If the Town chooses to provide the service, the full cost, including the fully-burdened labor rate and indirect cost estimates, should be billed to those communities that receive the service.

City of Groton Snow and Ice Removal

Recommendation 8: Adjust the City of Groton snow and ice event treatment plan to include the application of pre-wetted salt.

The Town and the City of Groton each maintain a similar level of service in the area of snow removal. Both communities target to achieve black pavement on all Town and City streets within 24 hours of the end of a snow or ice event. However, the Town and the City utilize different treatment approaches. The Town utilizes salt as well as pre-wetted salt, or brine, to treat roads. The City utilizes a salt and sand combination.

Pre-wetted salt is a salt that has been coated with a liquid chemical prior to being spread on a snow or ice covered surface. While hundreds of compounds can be used to pre-wet salt, three liquids are typically used: sodium chloride, liquid calcium, and magnesium chloride.

A pre-wetted solution works more effectively for several reasons. First, the pre-wetted salt clings to the pavement instead of bouncing off the surface or getting cleared off by flowing traffic like rock salt. That means less salt is displaced, not only saving money but also having less of an impact on the environment. The liquid solution will also embed more easily into a frozen surface, which reduces scatter and works more effectively.

Using a pre-wetted salt enhances performance at any temperature because it ensures there is plenty of moisture to melt snow or ice, therefore pre-wetted salt works faster at a lower temperature with less waste. It also reduces the frequency of necessary catch basin cleaning. Given the value of a pre-wetted approach, the City of Groton should investigate transitioning away from using sand and begin utilizing pre-wetted salt.

Service Sharing and Collaboration

Recommendation 9: Explore collaboration and service sharing opportunities between the Town and the City.

As previously discussed in the benchmarking section of this assessment, the Town and City Public Works Departments perform many of the same tasks and responsibilities. The Novak Consulting Group's review of operations indicates that there may be opportunities for service sharing and collaboration between the two departments that could generate savings and potentially improve service for the Groton residents. These initial opportunities are detailed below.

- **Heavy Equipment Sharing** – Cost savings from developing a Town and City heavy equipment sharing pool will be realized by avoiding capital cost for replacement of the equipment in the future and from salvage value income realized by disposal of excess equipment. For example, if the Town and City each have front-end loaders that are used on a basis that would allow them to share a single front-end loader, the jurisdictions avoid the capital cost of purchasing one front-end loader in the future and earn income from the sale of the front-end loader not needed. The aggregated cost savings will be the sum of the present day cost of the number of pieces of equipment that would not have to be purchased in the future due to the availability of heavy equipment from the pool plus the total of the salvage value income realized.
- **Service Swapping** – The Town and the City perform many of the same functions, but the jurisdictions have developed differing specializations in two areas. Town Public Works staff perform street repairs and also pave roads for 14 days per year. City staff, by contrast, contract for repaving projects, but a large portion of their staff capacity during warmer months focuses on masonry and concrete repair work pertaining to sidewalks and storm water basins. Given that each jurisdiction has developed these specializations, a service sharing agreement could be developed whereby each jurisdiction provides services to the other at a cost savings.

The opportunities summarized above represent steps toward developing a more robust and productive partnership between the Town and the City in the service of their residents.

Conclusion

This Highway Operations Comparative Analysis was undertaken to evaluate the structure, cost accounting process, and operational improvement opportunities within the Town and City of Groton and to develop a reliable basis to develop a reimbursement methodology for City public works operations. The Novak Consulting Group's review of the staffing and service level structures within the Town and the City indicate that both jurisdictions are reasonably staffed and structured when compared to their peers and within the context of workload demands and service level expectations. However, there is a clear need to develop a financing methodology that is based on reliable condition assessments of Town and City infrastructure.

The recommendations offered in this report outline an approach designed to position the Town and City to develop a cost share methodology based on infrastructure condition assessments, service level decisions, and outcome-based performance measurement.