

TO: Littleton Sewer Feasibility Study Committee
FROM: Natural Systems Utilities (NSU)
DATE: August 12, 2011
RE: Survey Report

Community Values Assessment which offers the community's values around decentralized natural systems from an economic, environmental, and social standpoint.

Residents of Littleton, MA were asked to participate in an online survey to assign importance to the following three key categories: economics, environment, and society. Participants had to assign a total of 100 points to the three categories with a break out of 35 points to economics, 30 to environment, and 35 points to society. The number of points assigned was done in proportion to the number of questions in each category, which were 7, 6, and 7 respectively for a total of 20 questions. These three sections themes were chosen to reflect the "triple-bottom-line", which incorporates the environmental and societal implications of an outcome in addition to the typical economic approach. Participants were also asked to provide a general ranking of the three categories.

There was a large variation in responses, though the final results of both the general and specific rankings showed that the town of Littleton values economics, environment, and society in order from most to least important. The breakdown of points by question and category is provided in Table 2 below.

To gain more in depth knowledge of the data, an analysis of the variance (ANOVA) was conducted to understand the statistical significance of the point assignments for each question within a category. An ANOVA test compares the mean point values assigned to determine whether the means are statistically equal. This "homogenizes" the data into groups and indicates if the variance between those groups is "significant". The specific method used, the Fisher's Least Significant Difference (LSD) procedure, uses a 95% confidence interval, meaning there is a 5% chance of calling a pair of questions significantly different when they are not in fact different (type I error).

The results of this analysis can be seen in Table 1. Within the columns of "homogeneous groups", any questions that share an X form a group of means within which there is no significant statistical difference. The analysis identified 4 homogeneous groups in economics, 3 in environment, and 4 in society. Grouping the questions provides a statistically valid way to rank their statistical significance as compared to other questions in the category.

To score each question, they were first given a "Q Rank", which was based on the number of questions from which they were statistically different. Questions ranged from being not statistically different from 0 to 4 questions, where 0 received a *Q Rank* = 5, 1 received a *Q Rank* = 4 and so on down to 4 with a *Q Rank* = 1.

The score was calculated by using the mean number of points as a multiplier. This incorporates both the number of points a question received and how far that number of points stood apart from other questions in the category (Q Rank). In the Economics section for example, Question 1 was definitively higher than all the other questions giving it a score of 55.60 while Question 2 received a low average number of points and was not highly variable from the mean scores of four of the other questions giving it a score of 3.78. Results from Question 1 can be interpreted as a definitive display of opinion, while there is less consensus amongst participants on Question 2. Questions with lower scores should receive extra focus to clarify the town's opinion.

Table 1: Homogeneous Groups Results and Scores from the Analysis of Variance Test

ECONOMICS					
	<i>Mean</i>	<i>Homogeneous Groups</i>	<i>Not Statistically Different From Q#:</i>	<i>Q Rank</i>	<i>Score</i>
Question 7	3.04523	X	2, 3	3	9.14
Question 3	3.45729	X X	2, 4, 5, 7	2	6.91
Question 2	3.77889	X X	3, 4, 5, 7	1	3.78
Question 5	4.22613	X X	2, 3, 4, 6	1	4.23
Question 4	4.46734	X X	2, 3, 5, 6	1	4.47
Question 6	4.90452	X	4, 5	3	14.71
Question 1	11.1206	X	-	5	55.60
ENVIRONMENT					
	<i>Mean</i>	<i>Homogeneous Groups</i>	<i>Not Statistically Different From Q #:</i>	<i>Q Rank</i>	<i>Score</i>
Question 9	3.76382	X	10, 11	3	11.29
Question 11	4.06533	X X	9, 10, 12	2	8.13
Question 10	4.49246	X X	9, 11, 12	2	8.98
Question 12	4.70854	X	10, 11	3	14.13
Question 13	6.43719	X	8	4	25.75
Question 8	6.53266	X	13	4	26.13
SOCIETY					
	<i>Mean</i>	<i>Homogeneous Groups</i>	<i>Not Statistically Different From Q#:</i>	<i>Q Rank</i>	<i>Score</i>
Question 18	3.43216	X	-	5	17.16
Question 20	4.57286	X	14, 15, 17	2	9.15
Question 17	4.84422	X	14, 15, 20	2	9.69
Question 15	4.84422	X	14, 17, 20	2	9.69
Question 14	5.15075	X X	15, 17, 19, 20	1	5.15
Question 19	5.9598	X X	14, 16	3	17.88
Question 16	6.19598	X	19	4	24.78

In addition to quantitative rankings, participants were given the opportunity to provide open-ended responses, suggestions, or opinions speaking to the prospect of smart sewerage in Littleton, MA. The comments were broken down into three main categories: positive, negative, or neutral. The final breakdown was negative – 35 comments, positive – 23 comments, neutral – 18 comments. Neutral comments primarily consisted of people who expressed interest in the idea given specific contingencies. The responses were also categorized by keywords such as business, environment, tax, cost, etc, to understand what citizens were most concerned or excited about. A selection of responses from the negative, positive, and neutral categories is provided below.

Negative:

“I do not support sewerage the common for the benefit of a handful of business owners - there will be increased traffic, increased taxes, unsightly parking lots, etc. This attempt to sewer the common appears to be driven by the common property owners, who will financially benefit at the expense of the rest of the town.”

“The committee needs to do a better job communicating to the residents how this will positively affect those who do not have a financial investment in the downtown area. At present, I can't think of one reason why I would want to vote for this to happen, I don't understand how this helps anyone outside the common. If it's to bring additional businesses into town, then I would like that plan to be communicated.”

“I am not in favor of spending a cent of taxpayer money for this, that only benefits the commercial ventures, when we have much greater priorities in education and services. Keep your common area in character, not provide incentives to build it up, commercially.”

Positive:

"As a resident of Adams St (which is tightly packed with small lots and has poor soil for septic systems) I think it is very important that the town provides a common sewer solution to downtown-area homes. I am willing to pay higher taxes to support this."

"Sewer system is a much better solution than septic. Septics have done damage to mill pond and long lake. It is time for sewerage in Littleton."

"Smart sewerage is great - how about sewerage and not just in the center!!! People ARE willing to pay to get this - some in town aren't going to even be able to sell their homes due to their septic tanks. Can this be expanded to a wider area of town???"

Neutral:

"I'm not convinced that it's the right approach yet, but for heaven's sake, if we do it, we should spend the money/time/thought to do it right."

"Any sewer options should be designed to include service to homes within the most densely populated areas, from the Common out to Long Lake, not just to serve business interests around the Common."

"Will residential homes have option of connecting to it? It sounds great and long needed. But must be done responsibly - environmentally safe, fit the rural character in town and controlled growth."

Table 2: Point breakdown of Littleton community value assessment of decentralized natural treatment systems

Littleton, MA Smart Sewering Survey

You've read about the Towns work to create a Smart Sewering Plan for the Downtown Districts, and you've learned about how natural systems can be a sustainable solution. Please rank the following three aspects of Sustainability in order of their importance to you when considering a Smart Sewering approach in Littleton. **3 = most important** **2 = important** **1 = least important**

	1 pt		2 pts		3 pts	
Economics	45	23.44%	44	22.92%	103	53.65%
Environment	32	16.67%	101	52.60%	59	30.73%
Society	115	59.90%	47	24.48%	30	15.63%

Distribute 100 points among the following 20 statements related to the Economics, Environmental, and Social aspects of Smart Sewering. To help you keep track of the points you've allocated, a running total is displayed at the bottom of each section. The total points over all three sections should add up to 100 points.

ECONOMICS

1. Capital Cost: The cost to build the system has no impact on your current property tax rates or existing utility bills	2213	31.77%
2. Phasing: The solution does not require investment of large sums for yet undetermined future capacity	752	10.80%
3. Financing : Grants and low-interest loans are available for financial support in building the system	688	9.88%
4. Operating Costs: Operating the system results in affordable utility rates to those using the system	889	12.76%
5. Local Economy: The solution protect valuable farmland and the livelihood of local farmers	841	12.07%
6. Economic Growth: The solution provides the infrastructure necessary to support economic growth in the town center	976	14.01%
7. Other Economic Benefits: The solution creates additional economic benefits like power generation, organic fertilizers, and additional income for the Town.	606	8.70%

Total 6965

Mean	3.39
Standard Dev.	2.12
Variance	4.49

NATURAL SYSTEMS UTILITIES

ENVIRONMENT

8. Clean Water: The system minimizes discharge of pollutants such as nutrients to water bodies	1300	21.78%
9. Water Balance: The solution sends water back into the ground – where it came from	749	12.55%
10. Water Conservation: The solution reduces the amount of water taken from local aquifers	894	14.97%
11. Green Space: The system reduces the loss of green space by not increasing impervious cover	809	13.55%
12. Energy Efficiency: The system is energy efficient	937	15.70%
13. Waste: The system does not produce large amounts of solid, liquid or gaseous waste that requires disposal in landfills or subsequent treatment systems	1281	21.46%
Total	5970	

Mean	3.53
Standard Dev.	1.85
Variance	3.41

SOCIETY

14. Community Identity The system supports the town's existing rural residential character	1025	14.72%
15. Controlled Growth The system supports managed growth by enabling the community to dictate appropriate locations for development	964	13.84%
16. Quality of Life: The system is not an unsightly eyesore, does not emit odors and emits no loud noise	1233	17.70%
17. Recreation: The system does not pose a threat to local water sources that are used for recreation purposes such as swimming, boating and fishing	964	13.84%
18. Resilience: The system is designed so that in the event of a disaster, the minimum number of people and the least property would be affected	683	9.81%
19. Safety: The system would be located at a safe distance from drinking water supply sources	1186	17.03%
20. Equitability: The district's system provides benefits to the entire community	910	13.07%
Total	6965	

Mean	3.94
Standard Dev.	2.00
Variance	4.01